

AN
X-RAY ATLAS
OF THE
NORMAL AND ABNORMAL STRUCTURES
OF THE
BODY

McKENDRICK AND WHITTAKER

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BY

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PREFACE

IN this Atlas an attempt has been made to provide a series of radiograms illustrating the normal and abnormal structures of the body, and also the more common injuries and diseases. To lend interest to the work, a few rare conditions have been added.

The authors are fully aware that radiographic interpretation can only be satisfactorily learned from a careful study of actual negatives, and by assisting at "screen" examinations. To those, however, who have not these facilities, an atlas is essential.

Sixty radiograms have been devoted to a study of the normal joints of the limbs, and the different appearances presented by an alteration of the focus point.

Arrows directed to the chief feature of interest in each radiogram have been purposely omitted, as the authors are of opinion that better educational results are obtained if the student has to carefully search the print without any extraneous aid. In several cases, however, where the radiograms are difficult, key diagrams have been provided.

The authors thank all those who have contributed negatives, especially Dr Hope Fowler, Mr Henry Wade, Mr J. H. Gibbs, Mr Walter Mercer, and Mr A. P. Bertwistle.

We owe a deep debt of gratitude to Mr D. M. Greig, who has not only allowed us to draw upon his private collection, but also granted us permission to X-ray certain of the excellent specimens in the Museum of the Royal College of Surgeons of Edinburgh.

We also desire to record our indebtedness to the publishers for their many kindnesses and constant technical help.

THE AUTHORS.

EDINBURGH, *January* 1925.

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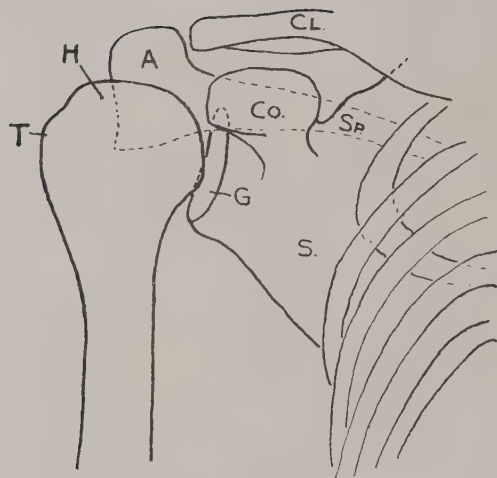
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NORMAL JOINTS OF THE LIMBS

NORMAL SHOULDER



- A, Acromion process.
 CL, Clavicle.
 Co, Coracoid process.
 G, Glenoid.
 H, Head of humerus.
 S, Scapula.
 Sp, Spine of scapula.
 T, Larger tubercle (great tuberosity)
 of humerus.

DIAGRAM 1.

Plate I. Fig. 1.—Normal Shoulder.

Position.—Back on plate ; arm by side.

View.—Antero-posterior.

Focus Point.—Normal.

In the natural position of the limb the mesial portion of the anatomical neck of the humerus is on a level with the junction of the middle and lower thirds of the glenoid cavity. When, however, the arm is abducted to nearly a right angle, the anatomical neck reaches the inferior margin of the glenoid (see Plate II. Fig. 6).

Note that the clavicle, glenoid, coracoid, and acromion occupy different planes.

Plate I. Fig. 2.—Normal Shoulder.

Position.—Back on plate ; arm by side.

View.—Antero-posterior.

Focus Point.—Four inches internal.

The glenoid is now seen more in profile, and the coracoid is apparently elongated.

Plate I. Fig. 3.—Normal Shoulder.

Position.—Back on plate ; arm by side.

View.—Antero-posterior.

Focus Point.—Four inches external.

With this focus point a better view is obtained of the face of the glenoid ; also the coracoid is seen more "end-on."

Plate I. Fig. 4.—Normal Shoulder.

Position.—Back on plate ; arm by side.

View.—Antero-posterior.

Focus Point.—Four inches above.

The humeral head and the glenoid cavity are seen at their best. The tip of the coracoid is observed "end-on," while the outline of the coracoid is ill-defined.

PLATE I.



FIG. 1.

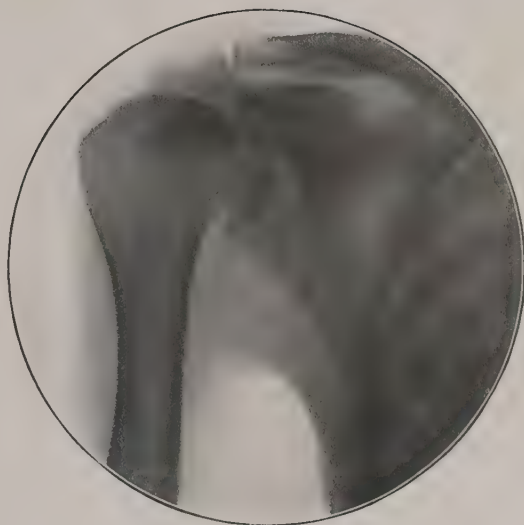


FIG. 2.



FIG. 3.



FIG. 4.

PLATE II.



FIG. 5.

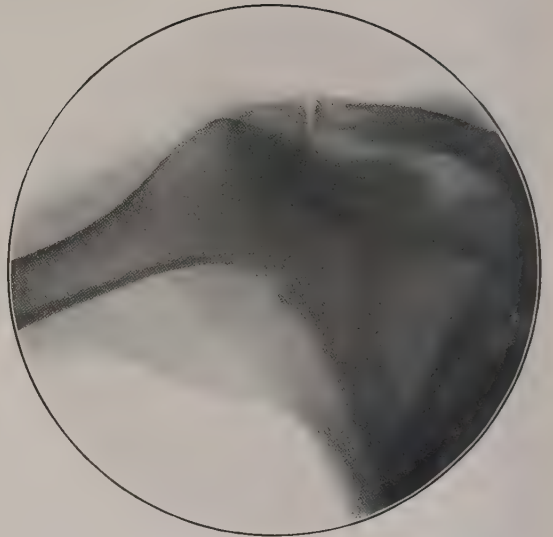


FIG. 6.



FIG. 7.



FIG. 8.

NORMAL SHOULDER

Plate II. Fig. 5.—Normal Shoulder.

Position.—Back on plate ; arm by side.

View.—Antero-posterior.

Focus Point.—Four inches below.

The tip of the acromion is best seen, and accordingly this is the ideal position for diagnosing a fracture of the acromion or a persistent acromial epiphysis.

Plate II. Fig. 6.—Normal Shoulder.

Position.—Back on plate ; abduction to nearly a right angle.

View.—Antero-posterior.

Focus Point.—Normal.

Note the relation of the anatomical neck of the humerus to the lower margin of the glenoid cavity. If further abduction is carried out, these relations are practically unaltered. Further abduction of the limb is accomplished by movement of the scapula and clavicle.

NORMAL ELBOW

- H, Humerus.
- R, Head of radius.
- O, Olecranon process.
- C, Coronoid process.
- LE, Lateral epicondyle.
- ME, Medial epicondyle.

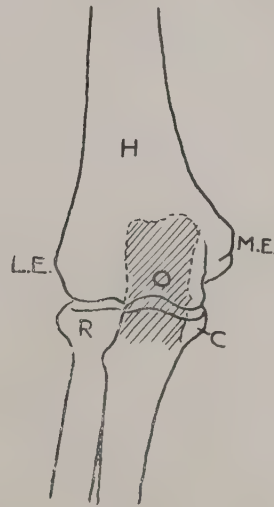


DIAGRAM 2.

Plate II. Fig. 7.—Normal Elbow.

Position.—Elbow extended ; back on plate.

View.—Antero-posterior.

Focus Point.—Normal.

Plate II. Fig. 8.—Normal Elbow.

Position.—Elbow extended ; back on plate.

View.—Antero-posterior.

Focus Point.—Four inches internal.

The shadows of the bones of the forearm are thrown further apart, and therefore a better view is obtained of the radius.

NORMAL ELBOW

Plate III. Fig. 9.—Normal Elbow.

Position.—Elbow extended ; back on plate.

View.—Antero-posterior.

Focus Point.—Four inches external.

This focus point produces overlapping of the shadows of the radius and ulna.

Plate III. Fig. 10.—Normal Elbow.

Position.—Elbow extended ; back on plate.

View.—Antero-posterior.

Focus Point.—Four inches above.

Plate III. Fig. 11.—Normal Elbow.

Position.—Elbow extended ; back on plate.

View.—Antero-posterior.

Focus Point.—Four inches below.

With the tube four inches above or four inches below, radiograms are scarcely distinguishable from those taken from the normal focus point.

Plate III. Fig. 12.—Normal Elbow.

Position.—Elbow semi-flexed ; medial epicondyle on plate.

View.—Lateral.

Focus Point.—Normal.

In a lateral view, semi-flexion may be considered the normal position, because in diseased joints this is the position of greatest ease.

Altering the focus point four inches makes very little change (see Plate IV. Figs. 13, 14, 15, and 16).

PLATE III.



FIG. 9.



FIG. 10.

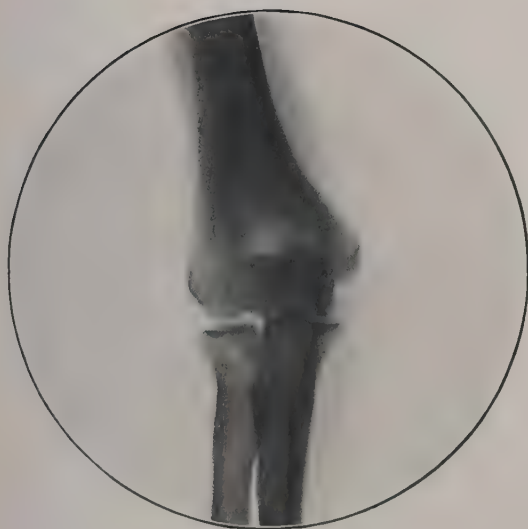


FIG. 11.

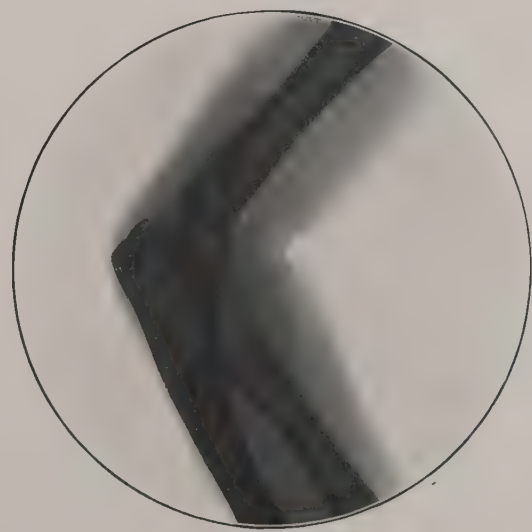


FIG. 12.

PLATE IV.

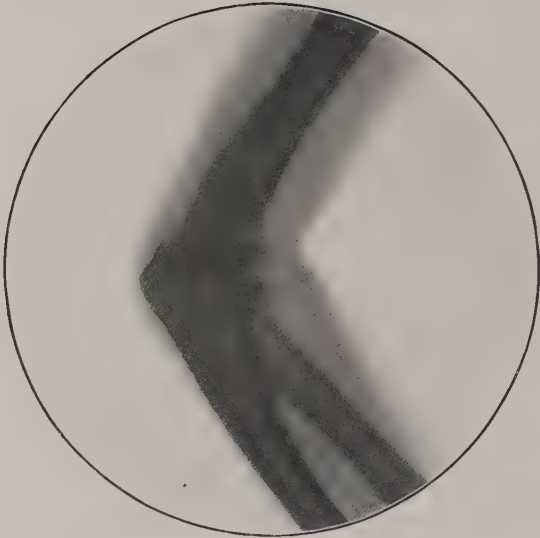


FIG. 13.

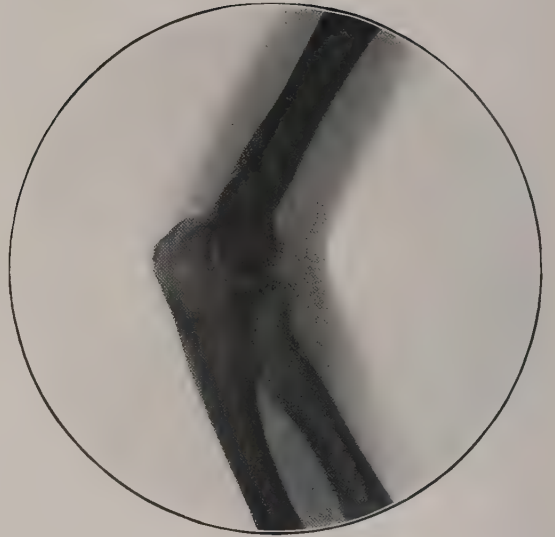


FIG. 14.

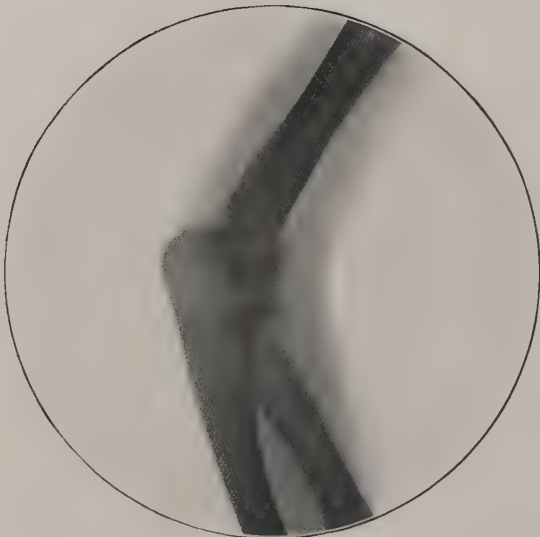


FIG. 15.



FIG. 16.

NORMAL ELBOW

Plate IV. Fig. 13.—Normal Elbow.

Position.—Elbow semi-flexed ; medial epicondyle on plate.

View.—Lateral.

Focus Point.—Four inches internal.

Plate IV. Fig. 14.—Normal Elbow.

Position.—Elbow semi-flexed ; medial epicondyle on plate.

View.—Lateral.

Focus Point.—Four inches external.

Plate IV. Fig. 15.—Normal Elbow.

Position.—Elbow semi-flexed ; medial epicondyle on plate.

View.—Lateral.

Focus Point.—Four inches above.

Plate IV. Fig. 16.—Normal Elbow.

Position.—Elbow semi-flexed ; medial epicondyle on plate.

View.—Lateral.

Focus Point.—Four inches below.

NORMAL WRIST

- R, Radius.
- U, Ulna.
- M, Metacarpals.
- N, Navicular.
- L, Lunate.
- T, Triquetrum.
- P, Pisiform.
- H, Hamatum.
- C, Capitatum.
- Mm, Multangulum majus (the multangulum minus is shaded).

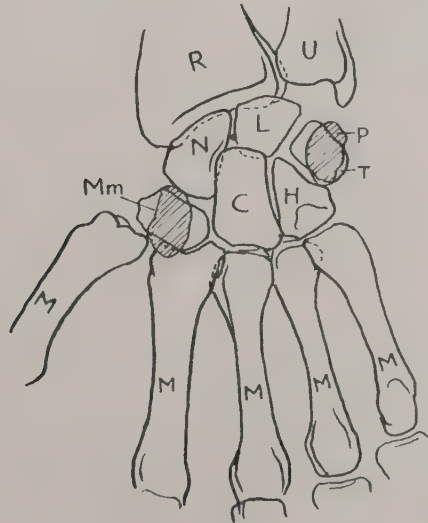


DIAGRAM 3.

NORMAL WRIST

Plate V. Fig. 17.—Normal Wrist.

Position.—Wrist straight ; palm on plate.

View.—Antero-posterior.

Focus Point.—Normal, *i.e.*, between the styloid processes.

The long axis of the hamatum lies very obliquely, being directed towards the radius, while the long axis of the capitatum is in the same plane as the navicular-lunate joint.

Plate V. Fig. 18.—Normal Wrist.

Position.—Full radial flexion ; palm on plate.

View.—Antero-posterior.

Focus Point.—Normal, *i.e.*, between the styloid processes.

In this position the navicular (scaphoid) is observed almost "end-on," with the articular facets for the multangulum majus (trapezium) and the multangulum minus (trapezoid), near the tip of the radial styloid. The joint between the navicular and capitatum (os magnum) is indistinct, while the lunate (semilunar) imperfectly articulates with the radius. Notice that the long axes of the capitatum, hamatum (unciform), and triquetrum (cuneiform) point towards the inferior radio-ulnar joint. The distance between the radial styloid and the multangular bones is diminished.

Plate V. Fig. 19.—Normal Wrist.

Position.—Full ulnar flexion ; palm on plate.

View.—Antero-posterior.

Focus Point.—Normal, *i.e.*, between the styloid processes.

When the hand is moved from the straight line towards that of ulnar deviation a marked change is seen in the position of the carpal bones. It is only in this position that the navicular can be brought to lie with its long axis parallel with that of the plate. This position is, therefore, the best one for showing fractures of the navicular, as these fractures occur across the long axis of the bone. Other anatomical points towards which attention should be directed, are—(a) the relationship of the capitatum to the other carpal bones is practically unaltered ; (b) the long axes of the hamatum, triquetrum, and navicular point more or less towards the radial styloid ; (c) the lunate is fully on its radial articulation ; and (d) the pisiform does not overlap the triquetrum to such a marked degree as in other positions of the hand.

Plate V. Fig. 20.—Normal Wrist.

Position.—Slight pronation ; ulnar side of hand on plate.

View.—Lateral.

Focus Point.—Normal, *i.e.*, radial styloid.

Lateral views of the wrist may be very misleading, because the shadows of the individual carpal bones are superimposed upon one another. This superimposition is greatly influenced by either slight pronation or supination.

Note that the two horns of the lunate are directed towards the finger tips. Note also the lateral view of the navicular (in line with the thumb) : some fractures of this bone show best in this view.

PLATE V.

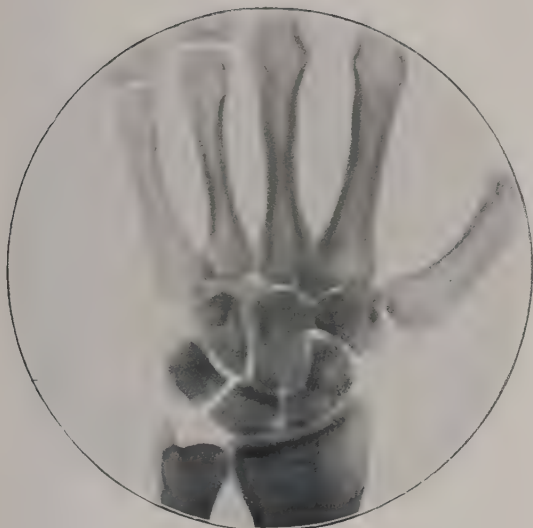


FIG. 17.



FIG. 18.



FIG. 19.



FIG. 20.

PLATE VI.

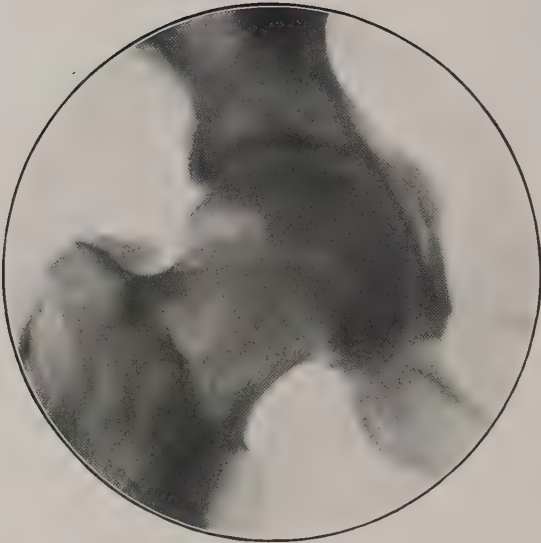


FIG. 21.

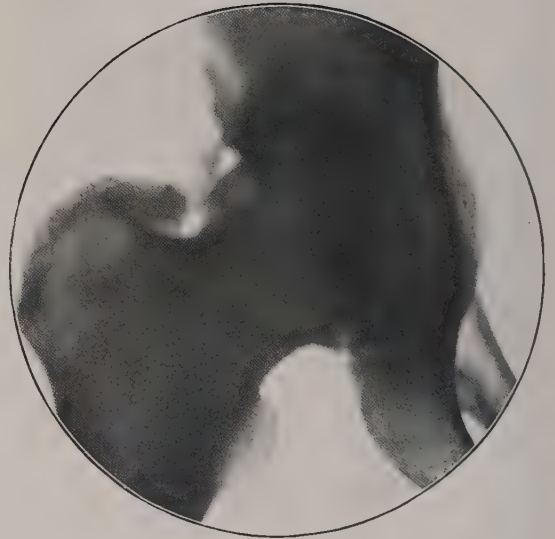


FIG. 22.



FIG. 23.

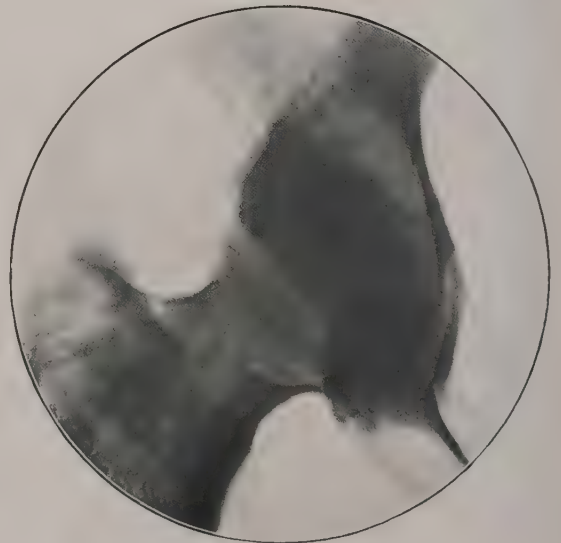


FIG. 24.

NORMAL HIP

- A, Ilium.
- B, Acetabulum.
- C, Head of femur.
- D, Neck of femur.
- E, Great trochanter.
- F, Lesser trochanter.
- G, Tuber ischii.
- H, Obturator foramen.
- I, Superior ramus of pubis.

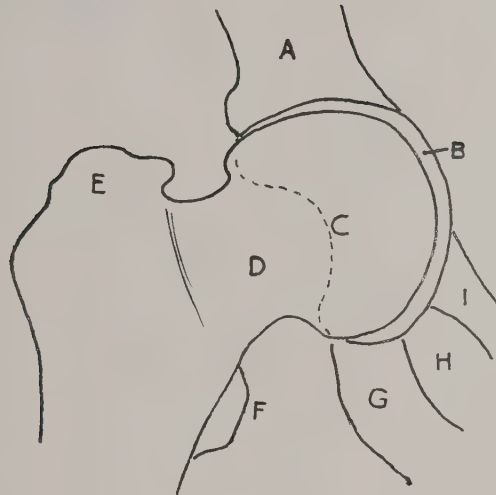


DIAGRAM 4.

Plate VI. Fig. 21.—Normal Hip.

Position.—Buttocks on plate; legs together; toes pointing directly upwards.

View.—Antero-posterior.

Focus Point.—Normal.

The natural position of the lower extremity is one with the toes turned outwards. The femoral head projects medially and markedly forwards; accordingly, a radiogram taken in this position will show fore-shortening of the neck of the femur. Another point of interest is the situation of the lesser trochanter. The extent to which it is visible affords a rough guide to the position of the limb at the time of the exposure. In normal hips, no matter the position of the limb, note that the upper border of the obturator foramen forms a continuous curve (Shenton's line) with the inferior margin of the neck of the femur.

Plate VI. Fig. 22.—Normal Hip.

Position.—Buttocks on plate; legs together; toes pointing directly upwards.

View.—Antero-posterior.

Focus Point.—Four inches internal.

The neck of the femur is shortened, the outline of the obturator foramen more acutely oval, the lesser trochanter not so well seen, and the summit of the great trochanter is more approximated to the upper edge of the acetabulum.

Plate VI. Fig. 23.—Normal Hip.

Position.—Buttocks on plate; legs together; toes pointing directly upwards.

View.—Antero-posterior.

Focus Point.—Four inches external.

A good view is obtained of the femoral neck, but the lesser trochanter is almost invisible.

Plate VI. Fig. 24.—Normal Hip.

Position.—Buttocks on plate; legs together; toes pointing directly upwards.

View.—Antero-posterior.

Focus Point.—Four inches above.

NORMAL HIP

Plate VII. Fig. 25.—Normal Hip.

Position.—Buttocks on plate ; legs together ; toes pointing directly upwards.

View.—Antero-posterior.

Focus Point.—Four inches below.

No advantage is gained with the focus point above or below the joint.

Plate VII. Fig. 26.—Normal Hip.

Position.—Buttocks on plate ; abduction and internal rotation.

View.—Antero-posterior.

Focus Point.—Normal.

With the limb in this attitude note the clear definition of the architectural structure of the femoral neck.

Plate VII. Fig. 27.—Normal Hip.

Position.—Buttocks on plate ; abduction.

View.—Antero-posterior.

Focus Point.—Normal.

Plate VII. Fig. 28.—Normal Hip.

Position.—Buttocks on plate ; internal rotation.

View.—Antero-posterior.

Focus Point.—Normal

PLATE VII.



FIG. 25.



FIG. 26.

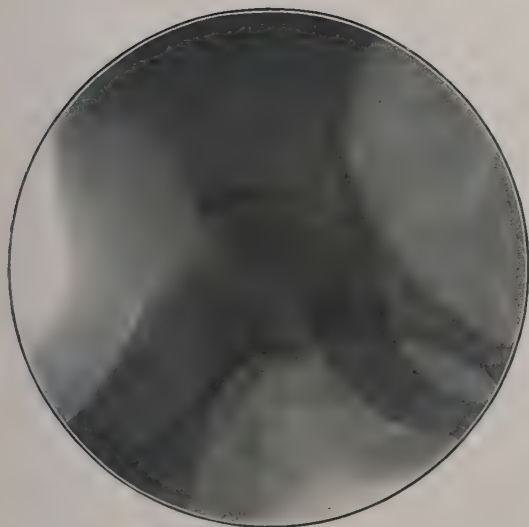


FIG. 27.



FIG. 28.

PLATE VIII.



FIG. 29.

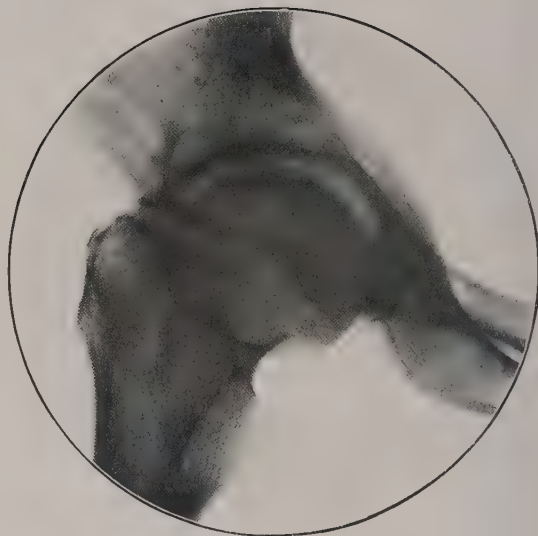


FIG. 30.

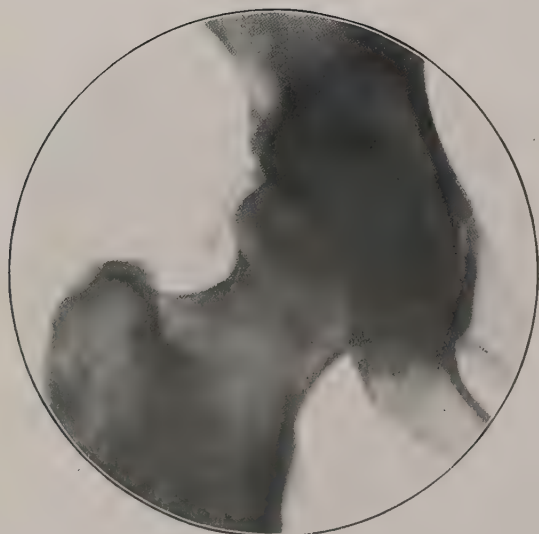


FIG. 31.

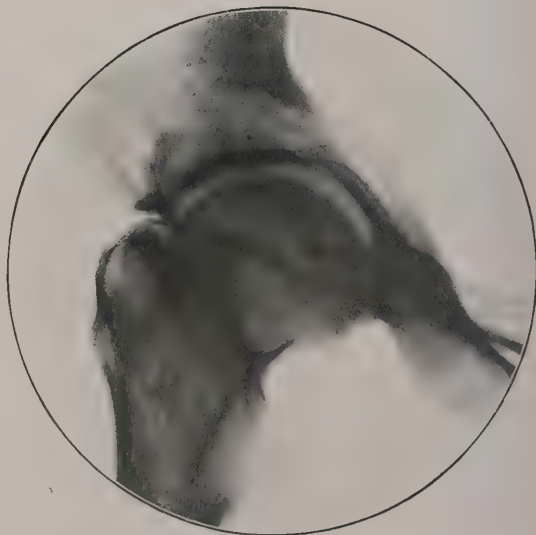


FIG. 32.

NORMAL HIP

Plate VIII. Fig. 29.—Normal Hip.

Position.—Buttocks on plate ; external rotation.

View.—Antero-posterior.

Focus Point.—Normal.

Plate VIII. Fig. 30.—Normal Hip.

Position.—Buttocks on plate ; abduction and external rotation.

View.—Antero-posterior.

Focus Point.—Normal.

The lesser trochanter is distinctly seen, but the femoral neck appears very short.

Plate VIII. Fig. 31.—Normal Hip.

Position.—Buttocks on plate ; adduction and internal rotation.

View.—Antero-posterior.

Focus Point.—Normal.

Plate VIII. Fig. 32.—Normal Hip.

Position.—Buttocks on plate ; abduction and external rotation.

View.—Antero-posterior.

Focus Point.—Four inches internal (pubes)

NORMAL KNEE

- F, Femur
- A, Adductor tubercle.
- T, Tibia.
- FIB, Fibula.
- Y, Intercondyloid eminence.
- X, " False " spine (on lateral articular facet).

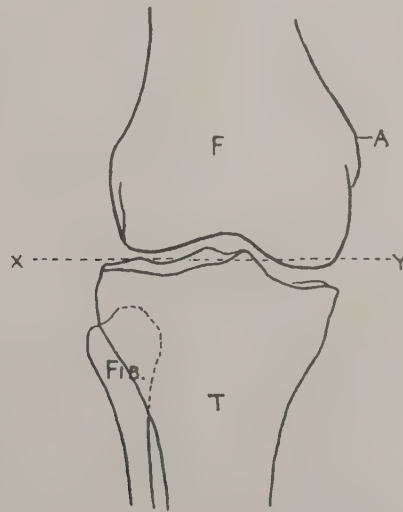


DIAGRAM 5.

NORMAL KNEE

Plate IX. Fig. 33.—Normal Knee.

Position.—Knee extended ; toes pointing to ceiling.

View.—Antero-posterior.

Focus Point.—Normal (middle of joint).

The reason for this choice of normal position is that the superior tibio-fibular joint lies postero-laterally. In the natural attitude of the lower extremity, with the toes pointing outwards, the fibula is directed more posteriorly, and accordingly a radiograph taken in this natural position will show overlapping of the tibial and fibular shadows.

Observe the two spines projecting from the upper surface of the tibia. The medial one is the intercondyloid eminence (tibial spine); the lateral one, or "false" spine, is formed by the medial extremity of the lateral articular facet. The eminence is always more distinct than the "false" spine.

Plate IX. Fig. 34.—Normal Knee.

Position.—Knee extended ; toes pointing to ceiling.

View—Antero-posterior.

Focus Point.—Middle of patella.

Plate IX. Fig. 35.—Normal Knee.

Position.—Knee extended ; toes pointing to table, and inwards.

View.—Antero-posterior.

Focus Point.—Normal (middle of joint).

When it is necessary to show the upper part of the fibula clearly in the antero-posterior position, the limb must be internally rotated.

Plate IX. Fig. 36.—Normal Knee.

Position.—Knee extended ; toes pointing to table and inwards.

View.—Antero-posterior.

Focus Point.—Four inches internal.

PLATE IX.

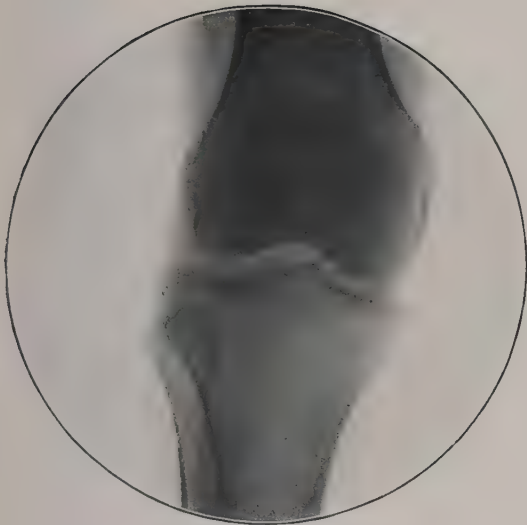


FIG. 33.



FIG. 34.



FIG. 35.

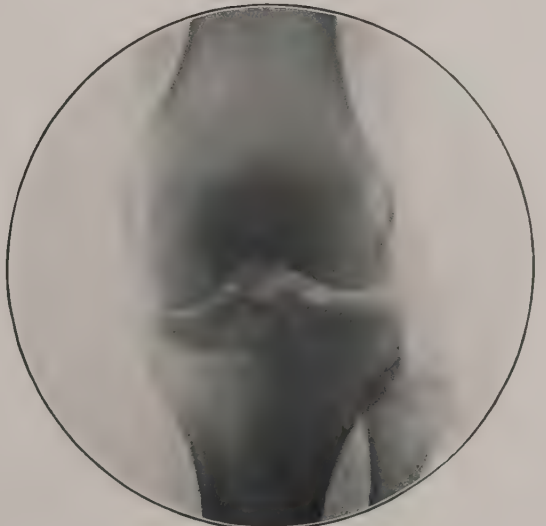


FIG. 36.

PLATE X.

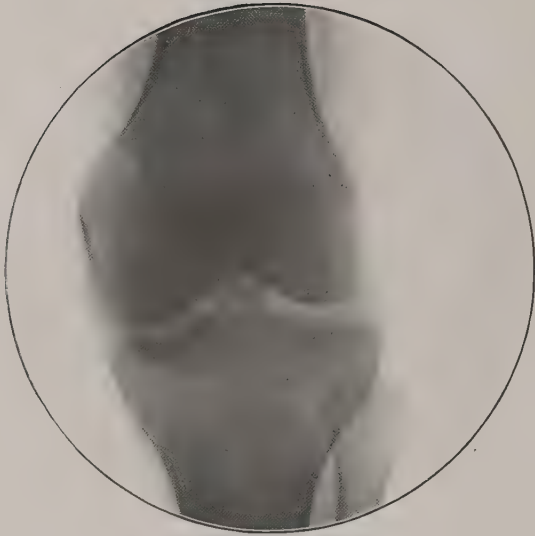


FIG. 37.



FIG. 38.



FIG. 39.

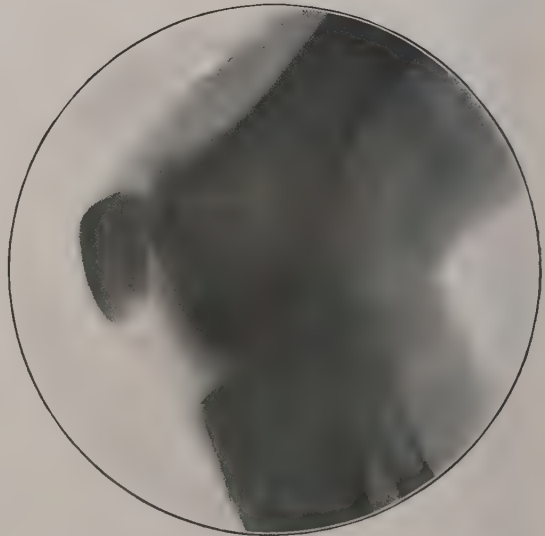


FIG. 40.

NORMAL KNEE

Plate X. Fig. 37.—Normal Knee.

Position.—Knee extended ; toes pointing to table.

View.—Antero-posterior.

Focus Point.—Four inches external.

NORMAL KNEE (LATERAL VIEW)

- F, Femur.
- P, Patella.
- EC, Lateral condyle.
- IC, Medial condyle.
- T, Tibia.
- Fi, Fibula.

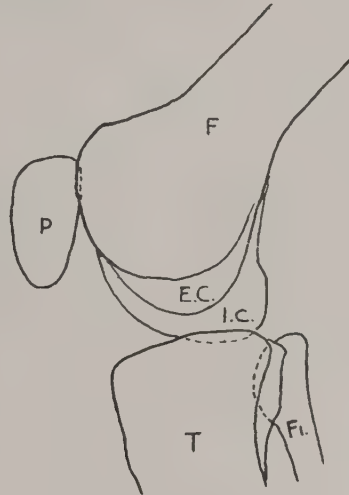


DIAGRAM 6.

Plate X. Fig. 38.—Normal Knee.

Position.—Knee extended ; lateral condyle to plate.

View.—Lateral.

Focus Point.—Normal (middle of joint).

Note that the medial condyle of the femur is on a lower level than the lateral condyle. As the medial condyle of the femur and likewise the medial condyle of the tibia occupy a plane posterior to that of the lateral condyles of the femur and tibia, their shadows are always seen behind those of the latter.

Plate X. Fig. 39.—Normal Knee.

Position.—Full flexion ; lateral condyle to plate.

View.—Lateral.

Focus Point.—Normal (middle of joint).

In this position of the joint the shadows of the two femoral condyles almost coincide with each other.

Plate X. Fig. 40.—Normal Knee.

Position.—Semi-flexion ; lateral condyle to plate.

View.—Lateral.

Focus Point.—Normal (middle of joint).

Notice how the lower pole of the patella has altered its position with regard to the line of the joint. Owing to this change the lower pole of the patella does not make an accurate "normal" focus point.

NORMAL KNEE

Plate XI. Fig. 41.—Normal Knee.

Position.—Semi-flexion ; lateral condyle to plate.

View.—Lateral.

Focus Point.—Four inches to back.

Plate XI. Fig. 42.—Normal Knee.

Position.—Semi-flexion ; lateral condyle to plate.

View.—Lateral.

Focus Point.—Four inches to front.

With this focus point the shadow of the medial femoral condyle is thrown further behind that of the lateral condyle than in the normal.

An apparent break in the continuity of the margin of the lateral femoral condyle can be seen opposite the lower pole of the patella. This has often been diagnosed as erosion of the articular cartilage where particular attention has not been paid to the choice of focus point. The apparent defect is due to the overlapping of the shadow of a part of the non-articular area of the lower end of the femur.

Plate XI. Fig. 43.—Normal Knee.

Position.—Semi-flexion ; lateral condyle to plate.

View.—Lateral.

Focus Point.—Four inches above.

Plate XI. Fig. 44.—Normal Knee.

Position.—Semi-flexion ; lateral condyle to plate

View.—Lateral.

Focus Point.—Four inches below.

PLATE XI.



FIG. 41.



FIG. 42.

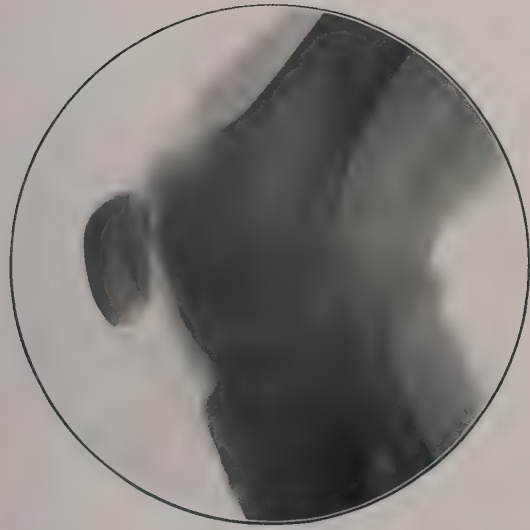


FIG. 43.



FIG. 44.

PLATE XII.

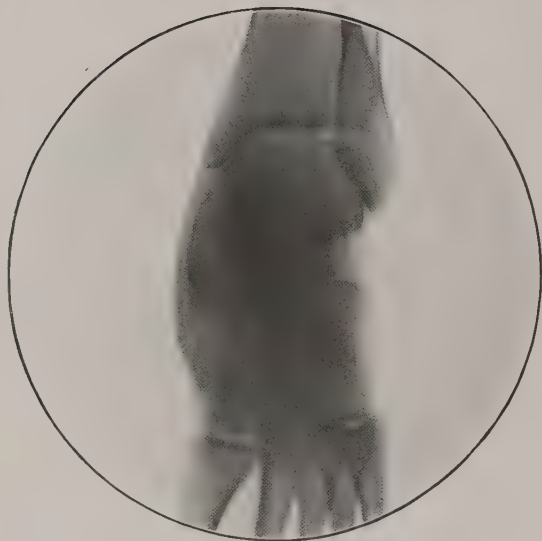


FIG. 45.



FIG. 46.



FIG. 47.



FIG. 48.

NORMAL ANKLE AND TARSUS
(LATERAL VIEW)

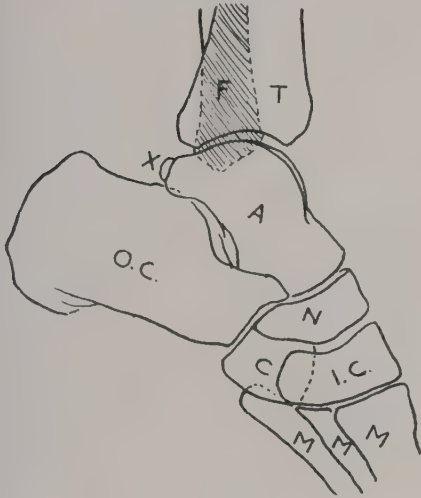


DIAGRAM 7.

F, Fibula.	N, Navicular.
T, Tibia.	C, Cuboid.
A, Talus.	IC, First cuneiform.
X, Os trigonum.	M, Metatarsals.
OC, Calcaneus.	

NORMAL ANKLE AND TARSUS
(MEDIAL VIEW)

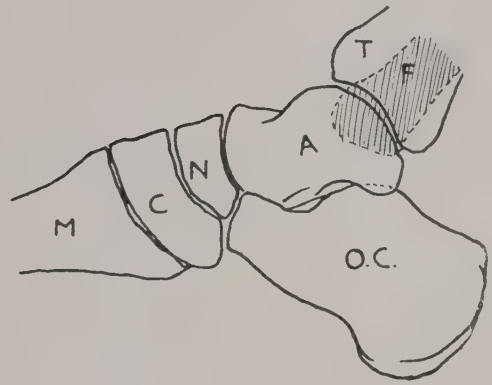


DIAGRAM 8.

T, Tibia.	N, Navicular.
F, Fibula.	C, First cuneiform.
A, Talus.	M, First metatarsal.
OC, Calcaneus.	

Plate XII. Fig. 45.—Normal Ankle and Tarsus.

Position.—Toes pointed (extreme plantar flexion).

View.—Antero-posterior.

Focus Point.—Normal (centre of joint).

The degree of flexion and extension markedly alters the radiographic appearance in the antero-posterior view. When seen laterally an alteration in the position does not make much difference. In this figure with the toes pointed note how the shadows of the calcaneus (os calcis) and talus (astragalus) obscure the joint. The overlapping of the tibia and fibula is well shown.

Plate XII. Fig. 46.—Normal Ankle and Tarsus.

Position.—Slight internal rotation; toes pointed.

View.—Antero-posterior.

Focus Point.—Normal (centre of joint).

Note the distortion suggesting that the ankle region had undergone some trauma

Plate XII. Fig. 47.—Normal Ankle and Tarsus.

Position.—Slight external rotation; toes pointed.

View.—Antero-posterior.

Focus Point.—Normal (centre of joint).

Plate XII. Fig. 48.—Normal Ankle and Tarsus.

Position.—Lateral malleolus to plate.

View.—Lateral.

Focus Point.—Normal (malleolus).

NORMAL ANKLE AND TARSUS

Plate XIII. Fig. 49.—Normal Ankle and Tarsus.

Position.—Lateral malleolus to plate.

View.—Lateral.

Focus Point.—Four inches towards heel.

Plate XIII. Fig. 50.—Normal Ankle and Tarsus.

Position.—Lateral malleolus to plate.

View.—Lateral.

Focus Point.—Four inches towards toes.

Plate XIII. Fig. 51.—Normal Ankle and Tarsus.

Position.—Lateral malleolus to plate.

View.—Lateral.

Focus Point.—Four inches above.

Plate XIII. Fig. 52.—Normal Ankle and Tarsus.

Position.—Lateral malleolus to plate.

View.—Lateral.

Focus Point.—Four inches below.

The best view of the cuboid is obtained with this focus point.

PLATE XIII.

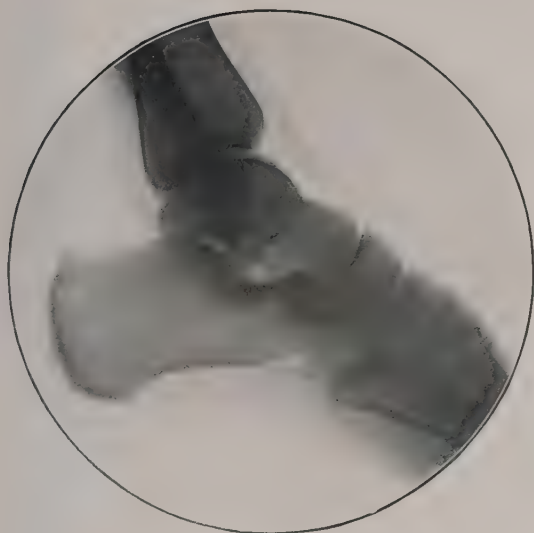


FIG. 49.



FIG. 50.



FIG. 51.



FIG. 52.

PLATE XIV.



FIG. 53.



FIG. 54.



FIG. 55.



FIG. 56.

NORMAL ANKLE AND TARSUS

Plate XIV. Fig. 53.—Normal Ankle and Tarsus.

Position.—Medial malleolus to plate.

View.—Lateral.

Focus Point.—Normal (malleolus).

Plate XIV. Fig. 54.—Normal Ankle and Tarsus.

Position.—Medial malleolus to plate.

View.—Lateral.

Focus Point.—Four inches to heel.

Plate XIV. Fig. 55.—Normal Ankle and Tarsus.

Position.—Medial malleolus to plate.

View.—Lateral.

Focus Point.—Four inches to toes.

Plate XIV. Fig. 56.—Normal Ankle and Tarsus.

Position.—Medial malleolus to plate.

View. Lateral.

Focus Point.—Four inches above.

NORMAL ANKLE AND TARSUS

Plate XV. Fig. 57.—Normal Ankle and Tarsus.

Position.—Medial malleolus to plate.*View*.—Lateral.*Focus Point*.—Four inches below.

Plate XV. Fig. 58.—Normal Ankle and Tarsus.

Position.—Sole on plate.*View*.—Dorsi-plantar.*Focus Point*.—Mid-tarsal joint.

Plate XV. Fig. 59.—Normal Ankle and Tarsus.

Position.—Sole on plate.*View*.—Dorsi-plantar.*Focus Point*.—Four inches medial.

Plate XV. Fig. 60.—Normal Ankle and Tarsus.

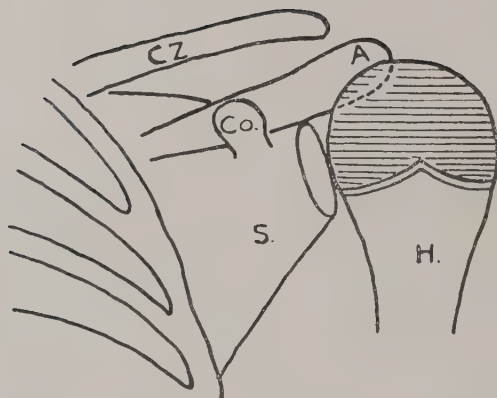
Position.—Sole on plate.*View*.—Dorsi-plantar.*Focus Point*.—Four inches lateral.

DIAGRAM 9.—EPIPHYSES OF SHOULDER REGION.

NORMAL SHOULDER REGION

CL, Clavicle.	S, Scapula.
A, Acromion.	H, Humerus.
Co, Coracoid.	

Plate XVI. Fig. 61.—Normal Shoulder Region (at 10 years).

Clavicle.—The sternal extremity possesses an epiphysis which appears during the twentieth year; it fuses with the shaft at the age of twenty-five.

Scapula.—A centre for the coracoid process appears towards the end of the first year, which fuses about puberty. Epiphyses for the acromion, coracoid, vertebral border, inferior angle, and lower part of the glenoid form during puberty. The epiphyses for the lower part of the glenoid and the acromion are united by the twentieth year, the remainder by the twenty-fifth. A subcoracoid centre for the upper portion of the glenoid is formed during the tenth year; it joins the rest of the bone about the age of sixteen.

Humerus.—There are three main epiphyses: (a) an upper one, including the head and tuberosities; (b) one for the medial epicondyle; and (c) an epiphysis for the rest of the distal extremity. The secondary centres are:—

(a) Proximal epiphysis—

	Appears.	Unites.
Head - - - - -	1st year	} 7th year.
Greater tuberosity - - - - -	3rd „	
Lesser tuberosity - - - - -	5th „	

The proximal epiphysis fuses with the shaft between the ages of twenty and twenty-five.

(b) Distal epiphysis—

	Appears.	Unites.
Capitulum and lateral part of trochlea - - - - -	3rd year	} 13th year.
Medial part of trochlea - - - - -	12th „	
Lateral epicondyle - - - - -	12th „	

PLATE XV.

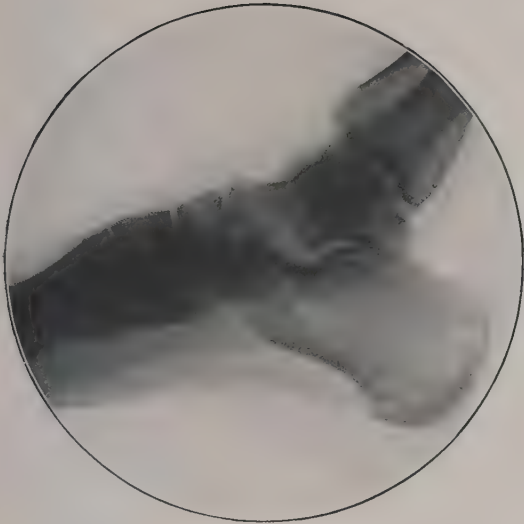


FIG. 57.



FIG. 58.



FIG. 59.



FIG. 60.

PLATE XVI.

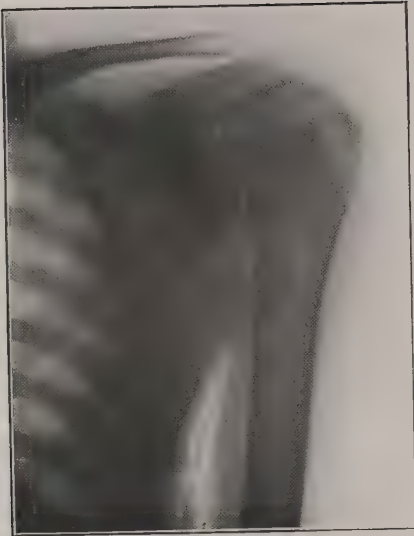


FIG. 61.

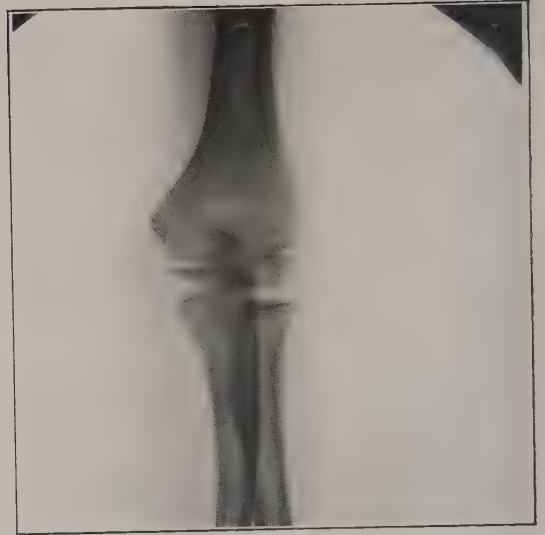


FIG. 62.

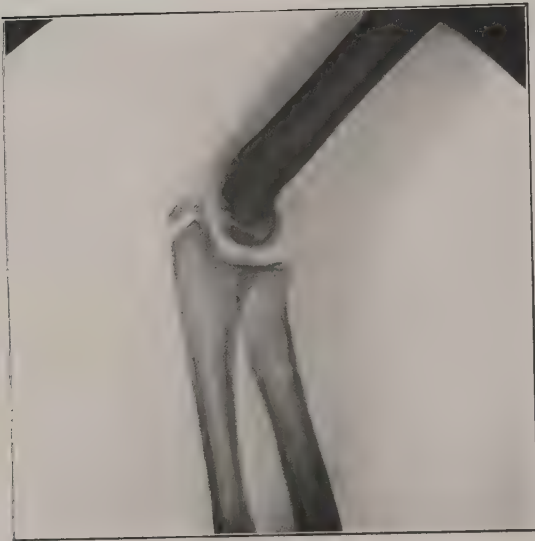


FIG. 63



FIG. 64.

NORMAL SHOULDER REGION

This epiphysis joins with the shaft during the seventeenth year.

(c) Medial epicondyle—

One centre - - - - - 5th year. 18th year.

Notice that in this radiogram there are two centres in the epiphysis of the olecranon.

NORMAL ELBOW

Plate XVI. Fig. 62.—Normal Elbow (at 10 years).

View.—Antero-posterior.

Plate XVI. Fig. 63.—Normal Elbow (at 10 years).

View.—Lateral.

Radius and Ulna.—The epiphyses for these bones are :—

<i>Radius—</i>	<i>Appears.</i>	<i>Unites.</i>
----------------	-----------------	----------------

Head - - 6th year. 18th year.

Distal extremity - 2nd „ 21st „

Bicipital tuberosity Puberty. Shortly after puberty.

Ulna—

Proximal extremity 10th year. 16th year.

Distal extremity - 6th ,, 21st ,,

The styloid processes of the radius and ulna do not usually appear until the twelfth year.

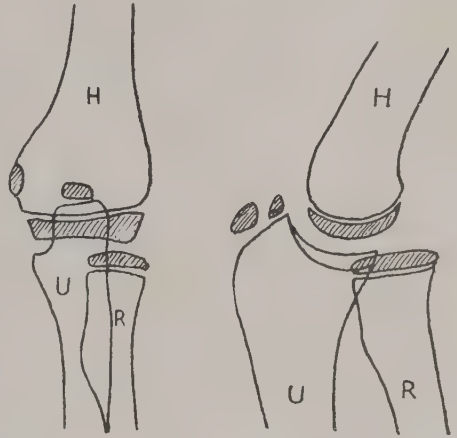


DIAGRAM 10.—EPIPHYSES OF ELBOW REGION. DIAGRAM 11.—EPIPHYSES OF ELBOW REGION.

H, Humerus. R, Radius. U, Ulna

NORMAL WRIST AND HAND

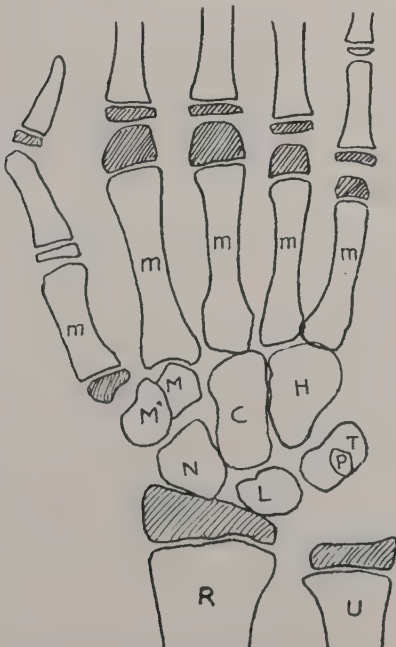


DIAGRAM 12.—EPIPHYSES OF CARPUS
AND HAND.

R, Radius.

U, Ulna.

N, Navicular.

L, Lunate.

P, Pisiform.

T, Triquetrum.

H, Hamatum.

C, Capitulum.

Mr, Multangulum majus.

M, Multangulum minus.

m, Metacarpals.

Plate XVI. Fig. 64.—Normal Wrist and Hand (at 10 years).

View.—Antero-posterior.

NORMAL WRIST AND HAND

Plate XVII. Fig. 65.—Normal Wrist and Hand (at 10 years).

View.—Lateral.

At birth the carpus is still cartilaginous. Later, each bone ossifies from a single centre as follows:—

1st year—The capitatum and hamatum. 5th year—The navicular, lunate, and multangulum majus.

3rd year—The triquetrum.

7th year—The multangulum minus.

10th year—The pisiform.

All the metacarpals and phalanges possess a separate epiphysis which, in the case of the thumb metacarpal and the phalanges, is situated proximally, but in the remaining metacarpals is placed distally. The epiphyses for the metacarpals and phalanges appear during the third year, and fuse about twenty.

NORMAL HIP

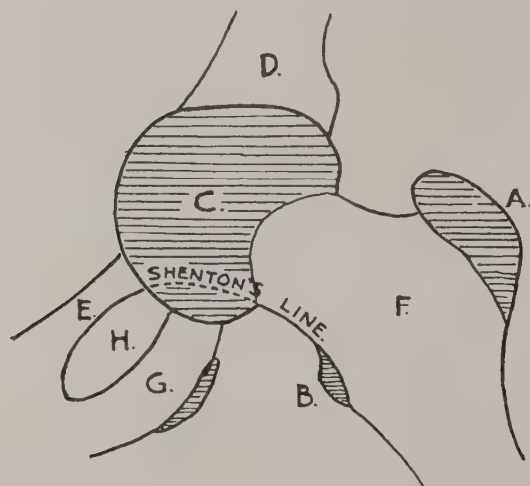


DIAGRAM 13.—EPIPHYSES OF HIP REGION.

- A, Great trochanter.
- B, Lesser trochanter.
- C, Head of femur.
- D, Ilium.
- E, Superior ramus of pubis.
- F, Femur.
- G, Tuber ischii.
- H, Obturator foramen.

Plate XVII. Fig. 66.—Normal Hip (at 10 years).

Os innominatum.—Fusion of the three elements forming the acetabulum occurs during the seventeenth year. Epiphyses for the iliac crest, anterior inferior iliac spine, tuber ischii, and the symphyseal part of the pubis appear at puberty; they are consolidated between twenty and twenty-five.

Femur.—This bone is surmounted by four epiphyses, namely:—

	Appears.	Unites.
Head	- 1st year	20th year
Greater trochanter	2nd "	19th "
Lesser trochanter	12th "	18th "
Distal extremity	- 9th month foetal life	21st "

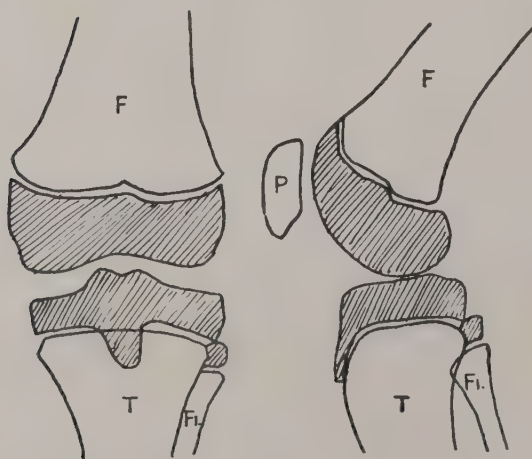


DIAGRAM 14.
EPIPHYSES OF KNEE.

DIAGRAM 15.
EPIPHYSES OF KNEE.

NORMAL KNEE

- F, Femur.
- T, Tibia.
- Fi, Fibula.
- P, Patella.

Plate XVII. Fig. 67.—Normal Knee (at 10 years).

View.—Antero-posterior.

Plate XVII. Fig. 68.—Normal Knee (at 10 years).

View.—Lateral.

PLATE XVII.



FIG. 65.



FIG. 66.

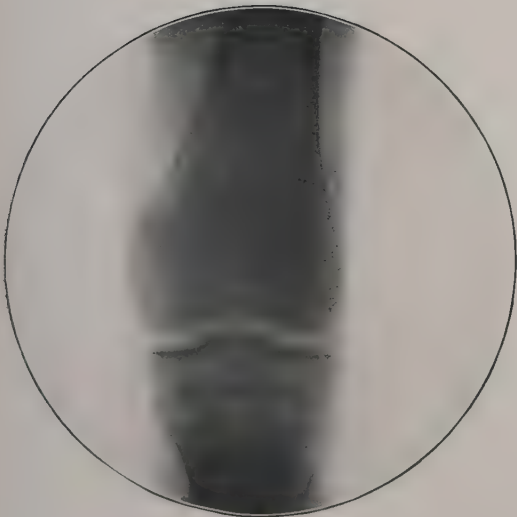


FIG. 67.



FIG. 68.

PLATE XVIII.



FIG. 69.



FIG. 70.

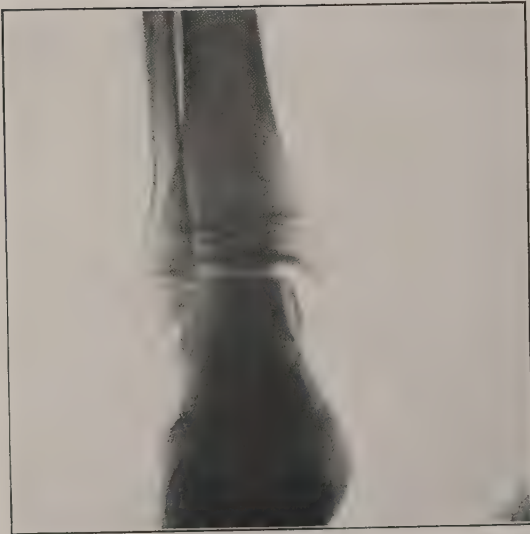


FIG. 71.



FIG. 72.

NORMAL KNEE

Plate XVIII. Fig. 69.—Normal Knee (at 18 years).

View.—Antero-posterior.

Patella.—Ossification commences in the patella about the third year, and is completed by puberty.

Tibia and Fibula.—Each of these bones has a proximal and a distal epiphysis.

<i>Tibia</i> —					Appears.	Unites.
Proximal end	-	-	-	-	Birth.	21st year.
Distal end	-	-	-	-	2nd year.	18th „
<i>Fibula</i> —						
Proximal end	-	-	-	-	4th year.	20th to 25th year.
Distal end	-	-	-	-	2nd „	18th „, 20th „

Observe the tongue-shaped projection from the anterior part of the proximal tibial epiphysis.

NORMAL ANKLE AND FOOT

F, Fibula.

T, Tibia.

A, Talus.

Note that the level of the epiphyseal junction of the fibula corresponds with the level of the ankle joint.

Plate XVIII. Fig. 70.—Normal Ankle and Foot (at 10 years).

View.—Lateral.

Plate XVIII. Fig. 71.—Normal Ankle and Foot (at 10 years).

View.—Lateral.

Plate XVIII. Fig. 72.—Normal Ankle and Foot (at 10 years).

View.—Dorsal.

Tarsus and Foot—The calcaneus is the only tarsal bone with an epiphysis; the rest of the tarsal bones develop from a single centre. The centres appear:—

	Time.					
Calcaneus and talus	-	-	-	-	-	Before birth.
(Epiphysis on dorsal surface of former appears during the eighth year, and fuses about eighteen.)						
Cuboid	-	-	-	-	-	Shortly before or after birth.
Third (external) cuneiform	-	-	-	-	-	1st year.
Second (middle) cuneiform	-	-	-	-	-	2nd „
First (internal) cuneiform	-	-	-	-	-	3rd „
Navicular	-	-	-	-	-	4th „

Epiphyses for the metatarsal bones and phalanges appear during the third year and join about eighteen. They are arranged in a similar manner to the corresponding bones of the hand.

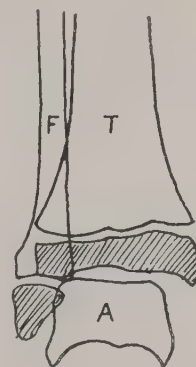


DIAGRAM 16.
EPIPHYSES OF ANKLE.

INJURIES AND DISEASES OF THE LIMBS

INJURIES AND DISEASES OF LIMBS

Plate XIX. Fig. 73.

Antero-posterior view of normal shoulder. This is similar to Fig. 1, and is repeated for the purpose of comparison with the skiagrams following.

Plate XIX. Fig. 74.

Fracture of spine of scapula. The fracture is seen below the clavicle and just medial to the coracoid process.

Plate XIX. Fig. 75.

Greenstick fracture at junction of middle and lateral thirds of left clavicle. Note the double outline of the upper humeral epiphysis: this is often mistaken for a fracture.

Plate XIX. Fig. 76.

Fracture of the body of the scapula below the surgical neck.

PLATE XIX.



FIG. 73.

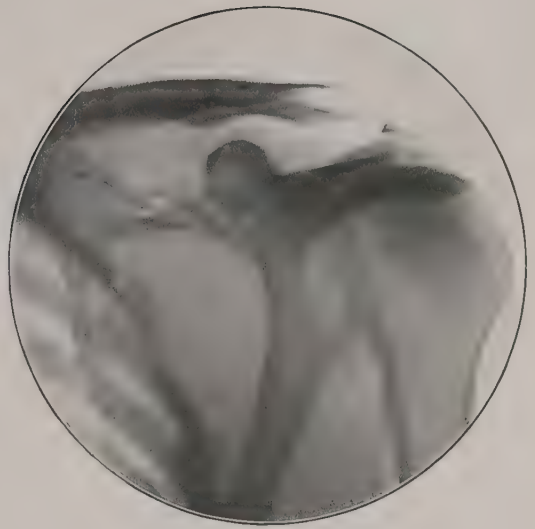


FIG. 74.

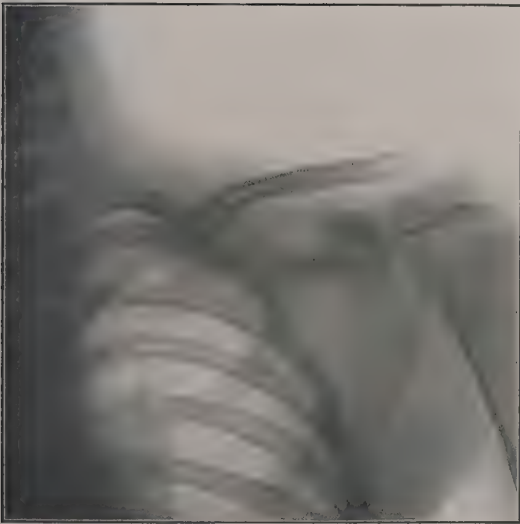


FIG. 75.



FIG. 76.

PLATE XX.



FIG. 77.



FIG. 78.



FIG. 79.

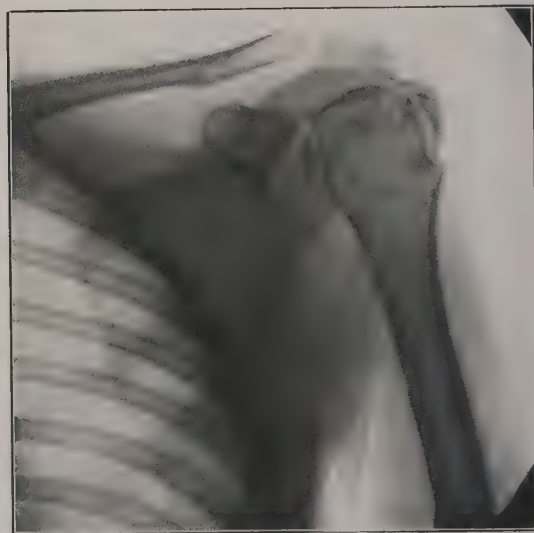


FIG. 80.

Plate XX. Fig. 77.

Fracture through anatomical neck of humerus.

Plate XX. Fig. 78.

Fracture involving the proximal part of the surgical neck of the humerus.

Plate XX. Fig. 79.

Fracture through distal portion of the surgical neck of the humerus.

Plate XX. Fig. 80.

Avulsion of the greater tuberosity of the humerus.

Plate XXI. Fig. 81.

Avulsion of the greater tuberosity of the humerus. Owing to the interference with the vascular supply, the separated portion has undergone osteoporosis.

Plate XXI. Fig. 82.

Avulsion of the greater tuberosity with marked osteoporosis of separated portion. In this case the avulsion was accompanied by dislocation of the shoulder.

Plate XXI. Fig. 83.

Recent separation of the proximal epiphysis of the humerus.

Plate XXI. Fig. 84.

Ancient separation of the proximal epiphysis of the humerus. Notice the marked absorption of the head of the bone.

PLATE XXI.



FIG. 81.



FIG. 82.



FIG. 83.



FIG. 84.

PLATE XXII.

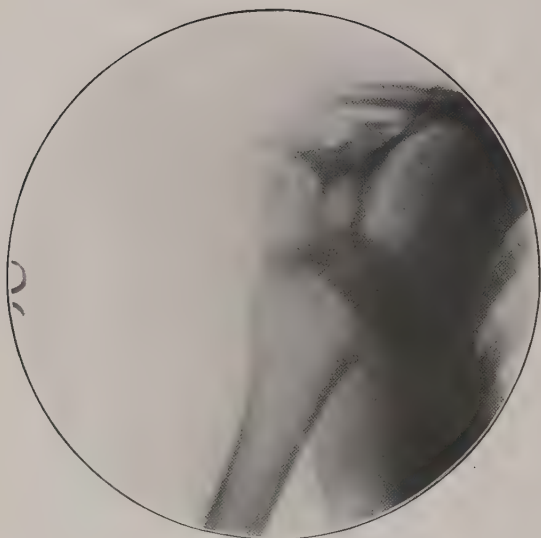


FIG. 85.

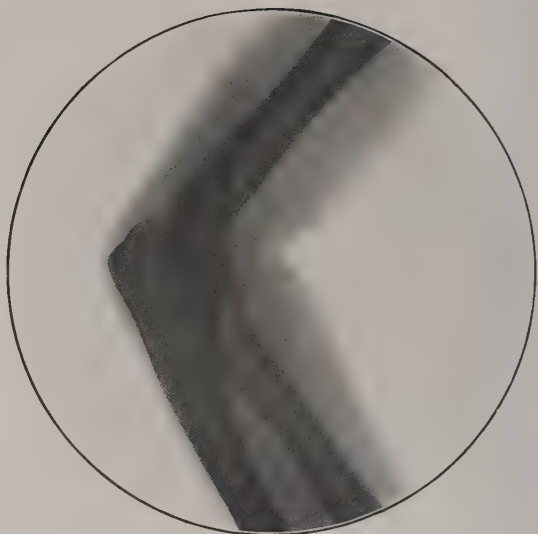


FIG. 86.

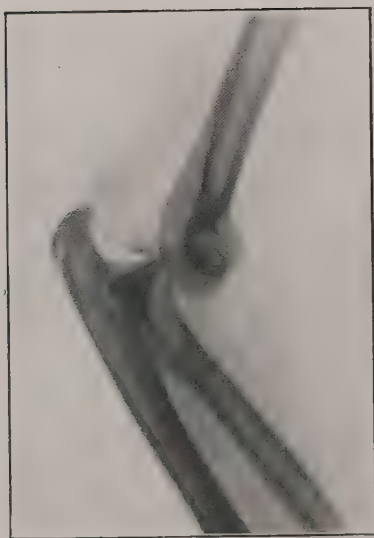


FIG. 87.



FIG. 88.

Plate XXII. Fig. 85.

Forward (subcoracoid type) dislocation of the shoulder joint.

Plate XXII. Fig. 86.

Normal elbow joint. A repetition of Fig. 12.

Plate XXII. Fig. 87.

Lateral view of a backward dislocation of both bones of the forearm.

Plate XXII. Fig. 88.

Lateral view of a backward dislocation of both bones of the forearm.

Plate XXIII. Fig. 89.

Traumatic myositis ossificans of brachialis muscle. A sequel of backward dislocation at the elbow joint.

Plate XXIII. Fig. 90.

Antero-posterior view of a lateral dislocation of the elbow joint.

Plate XXIII. Fig. 91.

Lateral view of the preceding case.

Plate XXIII. Fig. 92.

Fracture of the head of the radius without separation of the fragment.

PLATE XXIII.



FIG. 89.



FIG. 90.



FIG. 91.

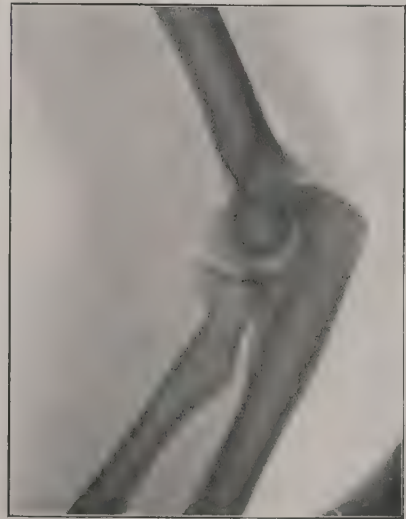


FIG. 92.

PLATE XXIV.



FIG. 93.

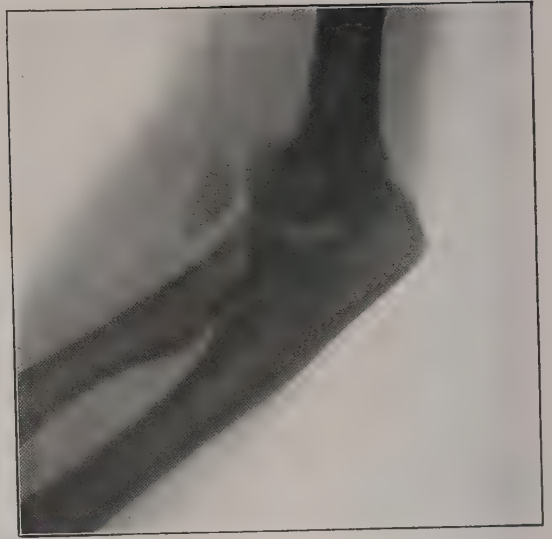


FIG. 94.



FIG. 95.



FIG. 96.

Plate XXIV. Fig. 93.

The common type of fracture of the anterior portion of the head of the radius. Note the displacement of the broken fragment.

Plate XXIV. Fig. 94.

Fracture of the head of the radius with greater displacement of the separated fragment.

Plate XXIV. Fig. 95.

Fracture of the olecranon process of the ulna ; only slight displacement is present.

Plate XXIV. Fig. 96.

Double fracture of the olecranon process of the ulna.

Plate XXV. Fig. 97.

Intercondylar fracture of distal end of the humerus.

Plate XXV. Fig. 98.

Supracondylar fracture of the humerus in a child. This form of injury occurs more frequently than separation of the distal epiphysis.

Plate XXV. Figs. 99 and 100.

Fracture of both bones of the forearms in childhood. The patient is now forty-seven years of age, and has the full use of his limbs. No splints were used in treatment. This is a good example of poor anatomical result, but excellent functional result.

PLATE XXV.



FIG. 97.

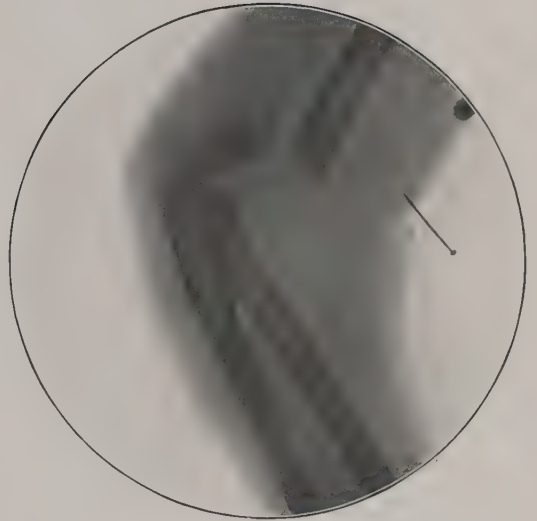


FIG. 98.

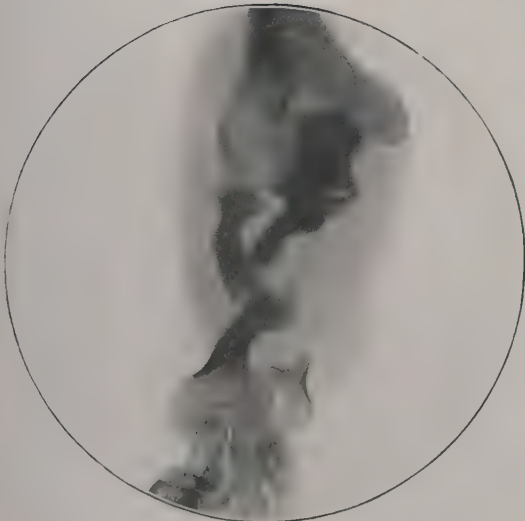


FIG. 99.

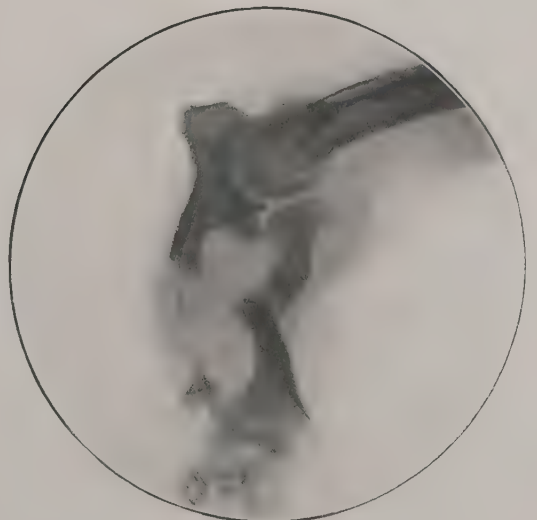


FIG. 100.

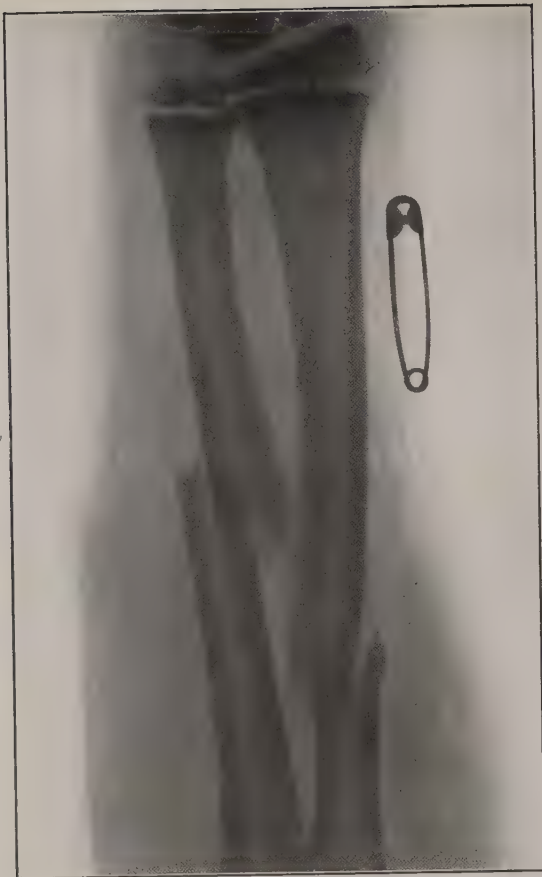


FIG. 101.



FIG. 102.

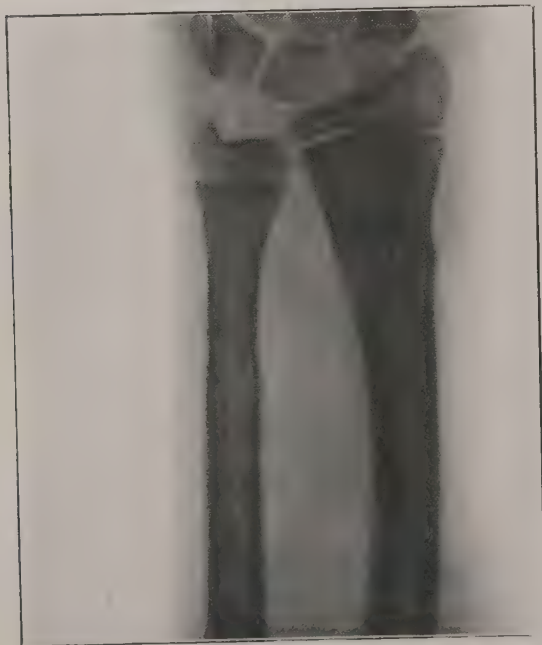


FIG. 103.



FIG. 104.

Plate XXVI. Fig. 101.

Fracture of both bones of the forearm before grafting.

Plate XXVI. Fig. 102.

Fracture of both bones of the forearm after grafting.

Plate XXVI. Fig. 103.

The common type of subperiosteal fracture of the radius through the distal part of the diaphysis.

Plate XXVI. Fig. 104.

Subperiosteal fracture of the shaft of the ulna near the proximal end:

Plate XXVII. Fig. 105.

Fracture of both bones of the forearm before grafting (same case as Figs. 101 and 102).

Plate XXVII. Fig. 106.

Old fracture of the ulna. A false joint has formed at the site of fracture. There is also dislocation of the proximal end of the radius. The radiogram was taken twenty-seven years after the injury. The man was earning full wages as a gardener during all this time.

Plate XXVII. Fig. 107.

Antero-posterior view of normal wrist.

Plate XXVII. Fig. 108.

Lateral view of normal wrist.



FIG. 105.



FIG. 106.



FIG. 107.



FIG. 108.

PLATE XXVIII.

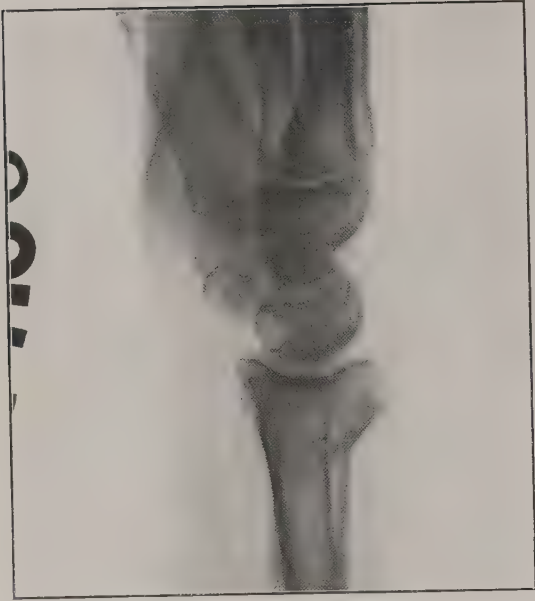


FIG. 109.



FIG. 110.



FIG. 111.



FIG. 112.

Plate XXVIII. Fig. 109.

Lateral view of a Colles' fracture after reduction.

(Mr J. N. J. Hartley.)

Plate XXVIII. Fig. 110.

Antero-posterior view of a Colles' fracture after reduction. Note avulsion of the ulnar styloid.

(Mr J. N. J. Hartley.)

Plate XXVIII. Fig. 111.

Lateral view of a Smith's fracture. Note that the distal fragment of the radius passes forwards and upwards.

Plate XXVIII. Fig. 112.

Antero-posterior view of a Smith's fracture. This case is complicated by a fracture of the lower end of the ulna.

Plate XXIX. Fig. 113.

Antero-posterior view of a Colles' fracture. Notice the (a) radial deviation of the hand, and (b) avulsion of the ulnar styloid. The patient has an old fracture of the metacarpal bone of the little finger.

Plate XXIX. Fig. 114.

Lateral view of a dislocation of the lunate bone: This is the first position with the cornua of the bone pointing to the fingers.

Plate XXIX. Fig. 115.

Lateral view of fracture of the navicular; it is complicated by a dislocation of the lunate. The horns of the lunate are directed towards the palm of the hand (the second position of dislocation).

Plate XXIX. Fig. 116.

Antero-posterior view of Fig. 115, which shows the fracture of the navicular better than the lateral view.

PLATE XXIX.



FIG. 113.



FIG. 114.

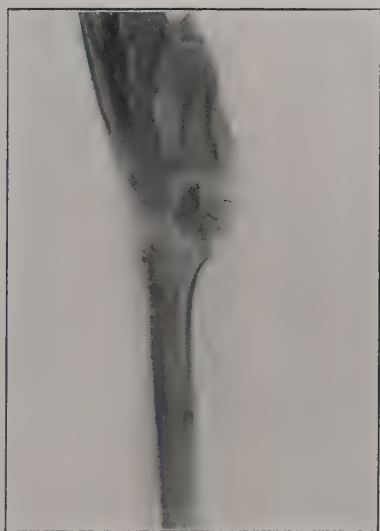


FIG. 115.



FIG. 116.

PLATE XXX.

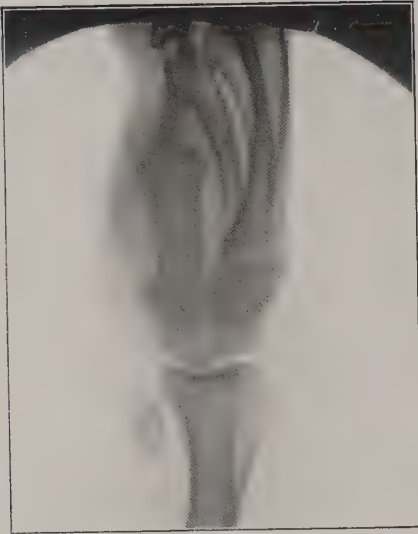


FIG. 117.



FIG. 118.

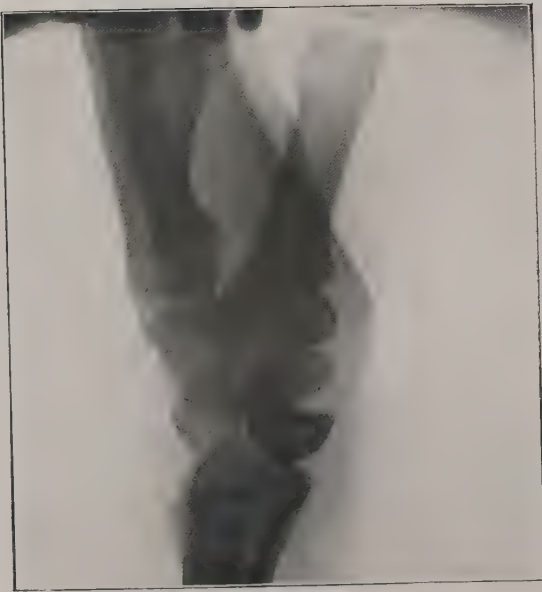


FIG. 119.

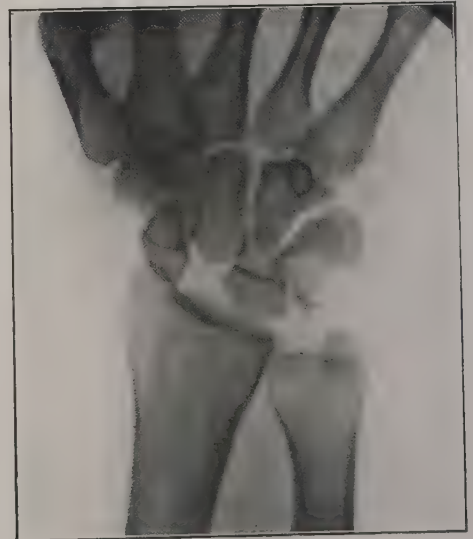


FIG. 120.

Plate XXX. Fig. 117.

Lateral view of dislocation of the lunate. This is the third and final position of the bone.

Plate XXX. Fig. 118.

Antero-posterior view of Fig. 117.

Plate XXX. Fig. 119.

Lateral view of dislocation of the lunate bone (first position).

Plate XXX. Fig. 120.

Rotational dislocation of the navicular, dislocation of the lunate, and fracture of the triquetrum.

Plate XXXI. Fig. 121.

Ununited fracture of the navicular five years after injury. Note the cystic hypertrophied condition of the condylar fragment.

Plate XXXI. Fig. 122.

Ununited fracture of the navicular of the "snapped wrist" type three years after injury; a certain amount of atrophy has occurred in the proximal fragment.

Plate XXXI. Fig. 123.

Old tear of the proximal attachment of the radial collateral ligament of the wrist. A deposition of bone at the site of injury can be seen.

Plate XXXI. Fig. 124.

Ununited fracture of the neck of the metacarpal of the index finger.

PLATE XXXI.

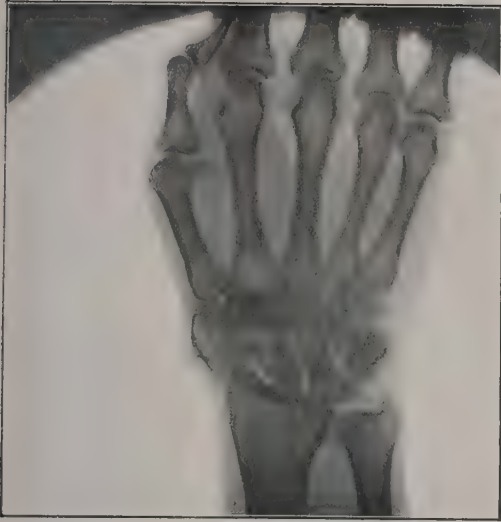


FIG. 121.



FIG. 122.



FIG. 123.



FIG. 124.

PLATE XXXII.



FIG. 125.



FIG. 126.



FIG. 127.



FIG. 128.

Plate XXXII. Fig. 125.

Recent Bennett's fracture of the metacarpal of the thumb. Note the displacement of the proximal fragment.

Plate XXXII. Fig. 126.

Healed Bennett's fracture.

Plate XXXII. Fig. 127.

Ununited fracture of the metacarpal of the index finger. United fractures of the middle and ring fingers from a circular saw accident are also present.

Plate XXXII. Fig. 128.

Backward dislocation at the metacarpo-phalangeal joint of the thumb. Note the position of the sesamoid bone of the m. flexor pollicis brevis.

Plate XXXIII. Fig. 129.

Lateral view of a lateral dislocation of the first interphalangeal joint of the little finger.

Plate XXXIII. Fig. 130.

Antero-posterior view of a lateral dislocation of the first interphalangeal joint of the little finger.

Plate XXXIII. Fig. 131.

Normal hip joint taken with the limb in extreme external rotation. Note the shortness of the femoral neck, and the shadow of the intertrochanteric line crossing it. This is often mistaken for fracture.

Plate XXXIII. Fig. 132.

Fracture through the base of the neck of the femur (the so-called "extracapsular" fracture). Impaction has occurred together with splintering of the great trochanter.

PLATE XXXIII.



FIG. 129.



FIG. 130.

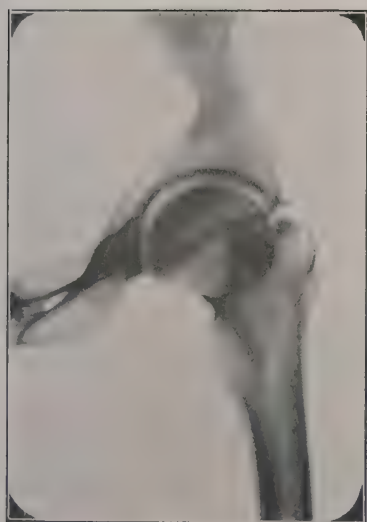


FIG. 131.



FIG. 132.

PLATE XXXIV.



FIG. 133.



FIG. 134.

Plate XXXIV. Fig. 133.

Fracture involving the superior ramus of the pubis.

Plate XXXIV. Fig. 134.

Cystic condition of the great trochanter in an old case of "slid epiphysis."

Plate XXXV. Fig. 135.

Antero-posterior view of a normal knee joint (a repeat of Fig. 33).

Plate XXXV. Fig. 136.

Lateral view of a normal knee joint (a repeat of Fig. 38).

Plate XXXV. Fig. 137.

Antero-posterior view of fracture of the lateral condyle of the tibia.

Plate XXXV. Fig. 138.

Lateral view of Fig. 137.

PLATE XXXV.



FIG. 135.



FIG. 136.



FIG. 137.



FIG. 138.

PLATE XXXVI.



FIG. 139.



FIG. 140.

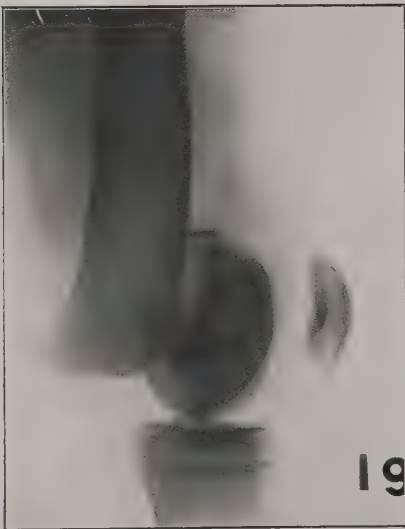


FIG. 141.

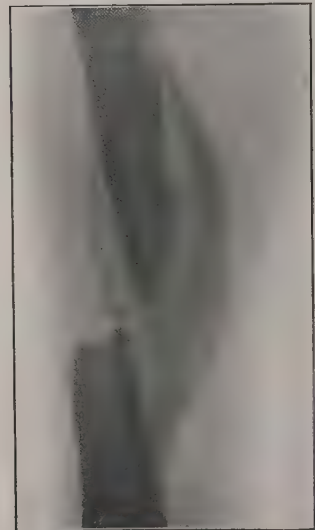


FIG. 142.

Plate XXXVI. Fig. 139.

Transverse fracture of the patella due to muscular violence. There is little or no separation of the fragments.

Plate XXXVI. Fig. 140.

Transverse fracture of the patella, showing separation of the fragments.

Plate XXXVI. Fig. 141.

Complete forward separation of the distal epiphysis of the femur.

Plate XXXVI. Fig. 142.

Fracture through the shaft of the femur. It is healing with an excess of callus.

Plate XXXVII. Fig. 143.

Cystic condition of the bone after healing of a fracture of the shaft of the tibia.

Plate XXXVII. Fig. 144.

Healed subperiosteal fracture of the tibia. Note that the medullary canal has been re-established, and that only a trace of external callus (towards the fibula) remains.

Plate XXXVII. Fig. 145.

Lateral view of a spiral fracture of the shaft of the tibia.

Plate XXXVII. Fig. 146.

Antero-posterior view of a spiral fracture of the shaft of the tibia.

PLATE XXXVII.



FIG. 143.



FIG. 144.



FIG. 145.

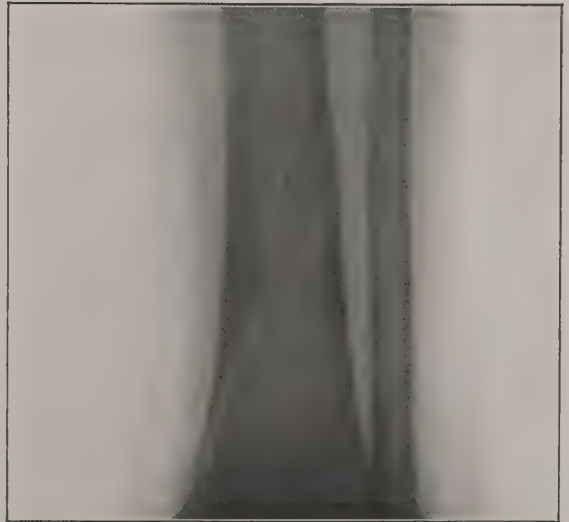


FIG. 146.

PLATE XXXVIII.



FIG. 147.

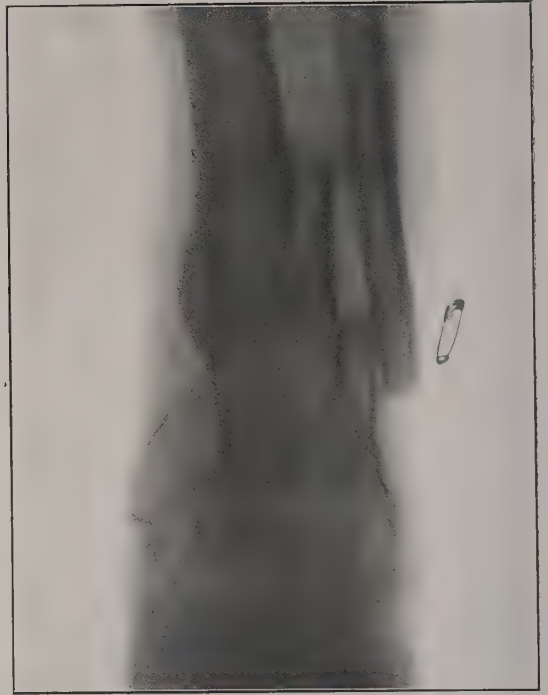


FIG. 148.

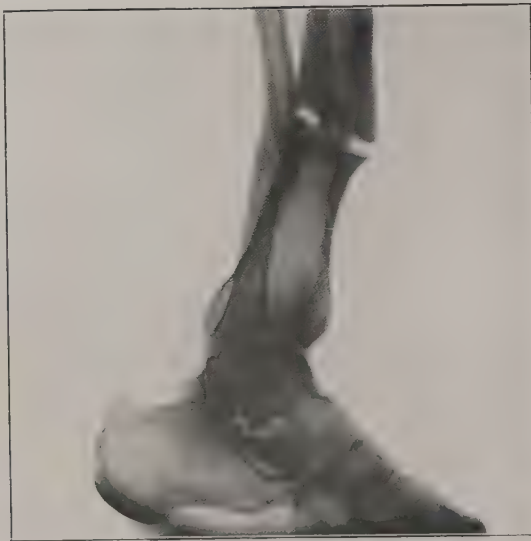


FIG. 149.



FIG. 150.

Plate XXXVIII. Fig. 147.

Spiral fracture of the tibia in a child suffering from rickets.

Plate XXXVIII. Fig. 148.

An atypical Pott's fracture due to crushing violence and *not* to twisting of the ankle.

Plate XXXVIII. Fig. 149.

Non-union of a fracture through the shaft of the tibia. Note the condensation of the bone at the site of fracture, with lipping at the edges of the false joint. The fracture of the fibula has united.

Plate XXXVIII. Fig. 150.

Separation of the anterior aspect of the distal epiphysis of the tibia, together with a fracture of the distal end of the shaft of the fibula.

Plate XXXIX. Fig. 151.

Fracture of both malleoli.

Plate XXXIX. Fig. 152.

Fracture of the lower end of the fibula.

Plate XXXIX. Fig. 153.

Oblique splitting of the lateral malleolus (lateral view).

Plate XXXIX. Fig. 154.

Antero-posterior view of same.

PLATE XXXIX.

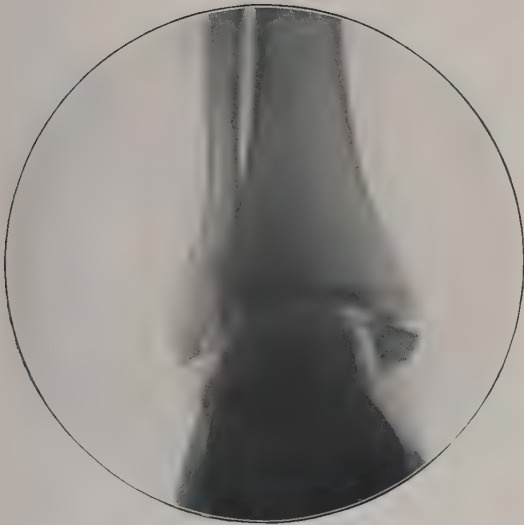


FIG. 151.



FIG. 152.



FIG. 153.



FIG. 154.

PLATE XL.

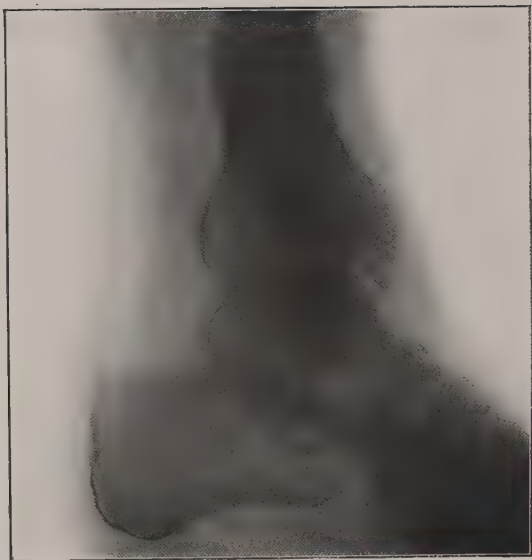


FIG. 155.

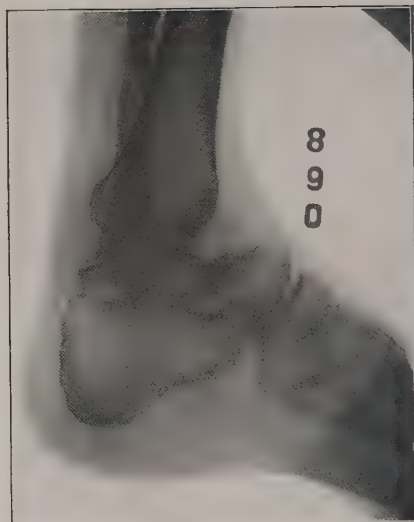


FIG. 156.



FIG. 157.

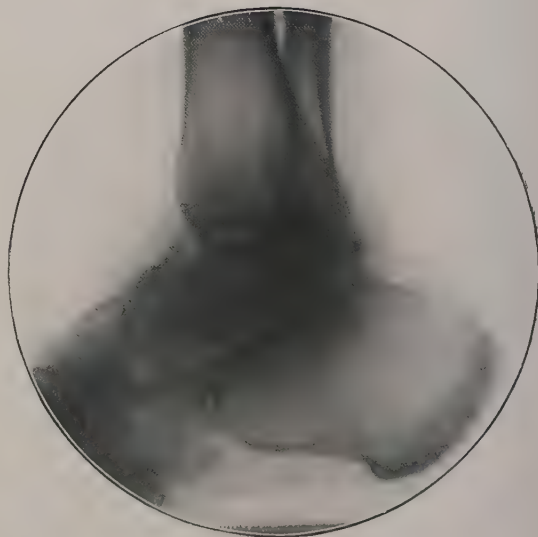


FIG. 158.

Plate XL. Fig. 155.

Healed Pott's fracture. Note the atheromatous vessels.

Plate XL. Fig. 156.

Fracture of the neck of the talus. There is also dislocation at the calcaneo-cuboid joint.

Plate XL. Fig. 157.

Fracture of the neck of the talus (recent).

Plate XL. Fig. 158.

Fracture of the neck of the talus (ancient). Compare this with Fig. 157, and note osteoporosis with loss of internal architectural arrangement of lamellæ.

Plate XLI. Fig. 159.

Healing fracture of the calcaneus. Note the atheromatous vessels seen just above the site of fracture. This fracture is seldom found unassociated with atheromatous vessels.

Plate XLI. Fig. 160.

Fracture of the calcaneus.

Plate XLI. Fig. 161.

Oblique fracture through the neck of the third metatarsal.

Plate XLI. Fig. 162.

Duplication of the mesial sesamoid of the flexor hallucis brevis. This is a common condition, and is often diagnosed as a fracture. (Case of Mr T. B. Patterson.)

PLATE XLI.

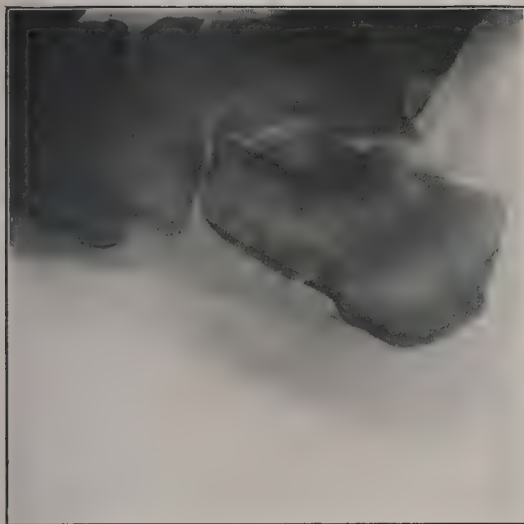


FIG. 159.

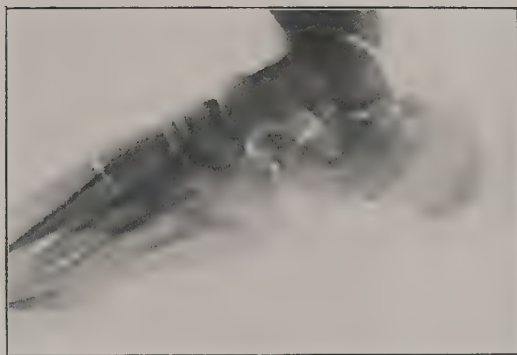


FIG. 160.



FIG. 161.



FIG. 162.

PLATE XLII.



FIG. 163.

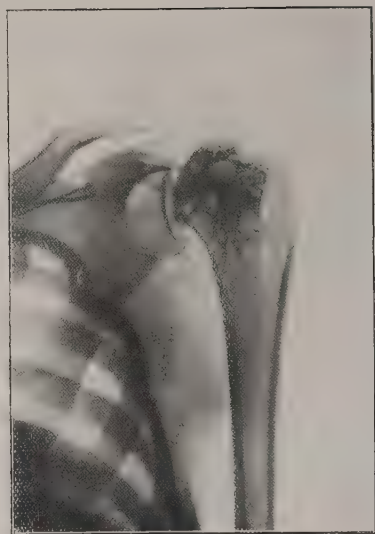


FIG. 164.

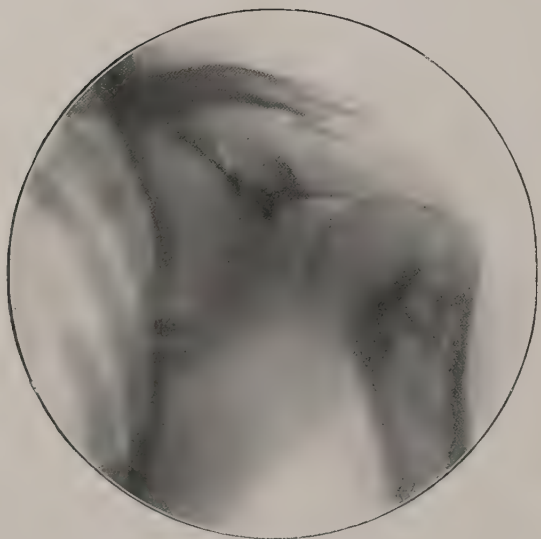


FIG. 165.



FIG. 166.

Plate XLII. Fig. 163.

Osteitis fibrosa cystica of the humerus.

Plate XLII. Fig. 164.

Caries sicca of the upper end of the humerus.

Plate XLII. Fig. 165.

Chronic arthritis of the hypertrophic type, involving the shoulder joint.

Plate XLII. Fig. 166.

Myeloma of the upper end of the humerus. Note how the epiphyseal portion of the bone has escaped. This denotes that the tumour commenced before the epiphysis had fused. Observe also the indefinite outline (woolly appearance) near the great tuberosity. This is indicative of malignancy.

Plate XLIII. Fig. 167.

Myeloma of the upper part of the humerus. The cystic appearance is well seen. Note the osseous trabeculae scattered through the tumour. A pathological fracture has occurred in the region of the head. (Museum of the Royal College of Surgeons of Edinburgh.)

Plate XLIII. Fig. 168.

Sarcomatous tumour in the region of the shoulder.

Plate XLIII. Fig. 169.

Tubercular abscess of the shaft of the humerus.

Plate XLIII. Fig. 170.

Bone cyst in the humerus of obscure origin. There was no history of trauma.

PLATE XLIII.

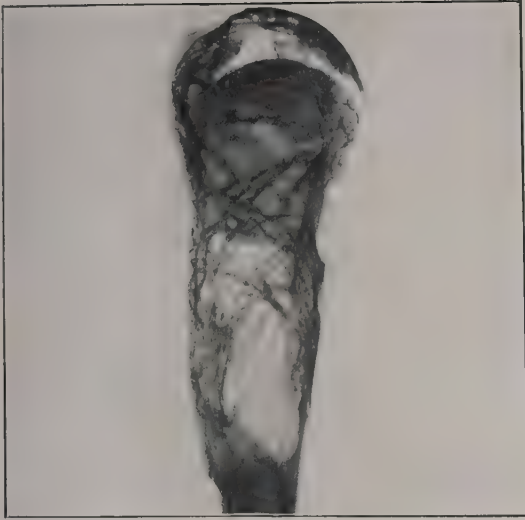


FIG. 167.
(Museum, Royal College of Surgeons of Edinburgh.)



FIG. 168.

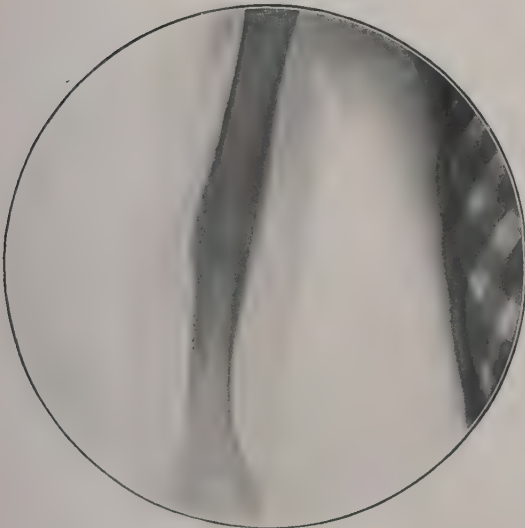


FIG. 169.

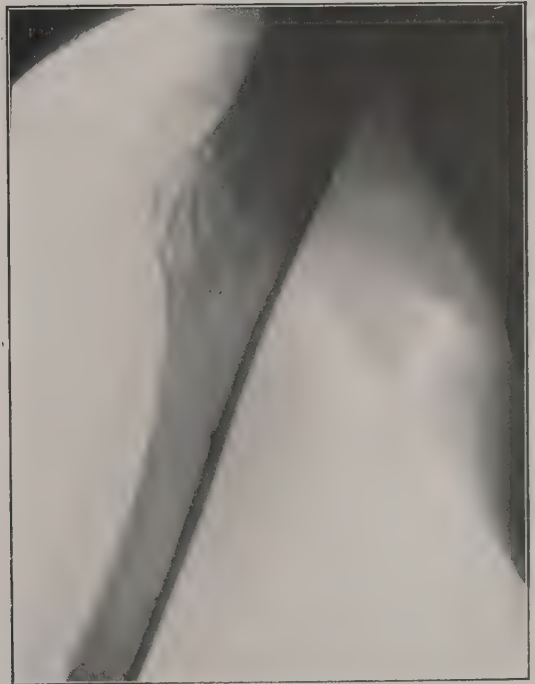


FIG. 170.

PLATE XLIV.



FIG. 171.

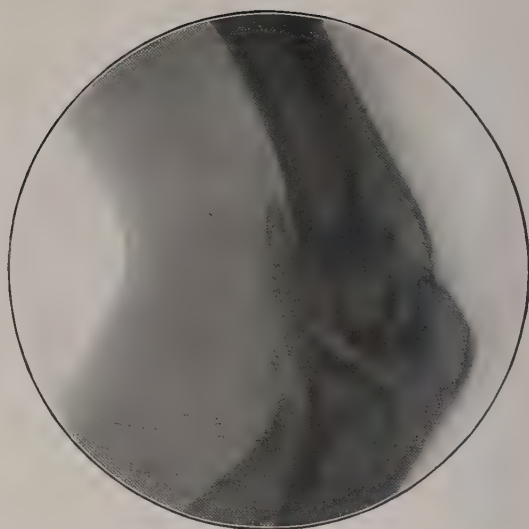


FIG. 172.



FIG. 173.

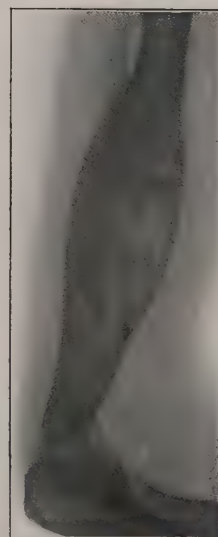


FIG. 174.

Plate XLIV. Fig. 171.

Antero-posterior view of elbow, showing myositis ossificans in brachialis muscle, after dislocation.

Plate XLIV. Fig. 172.

Lateral view of the preceding figure. Observe the clear angle between the anterior surface of the shaft of the humerus and the new bone. This angle is never found in sarcomatous conditions

Plate XLIV. Fig. 173.

Lateral view of another case of traumatic myositis ossificans. No clear angle can be seen in this radiogram owing to the spindle-shaped outline of the bony mass. The regularity of the edge of the humeral shaft is indicative of the innocence of the growth.

Plate XLIV. Fig. 174.

Cystic disease of the humerus localised to this single bone.

Plate XLV. Fig. 175.

From a case of generalised osteitis fibrosa. Apart from the obvious deformity of the humerus, note (*a*) the general hyperostosis; (*b*) the obliteration of the medullary cavity; (*c*) the tendency towards cyst formation; and (*d*) areas of decalcification.

(Museum of the Royal College of Surgeons of Edinburgh.)

Plate XLV. Fig. 176.

Tuberculous disease of the olecranon process of the ulna.

Plate XLV. Fig. 177.

Tuberculous disease of the elbow joint of synovial origin.

PLATE XLV.

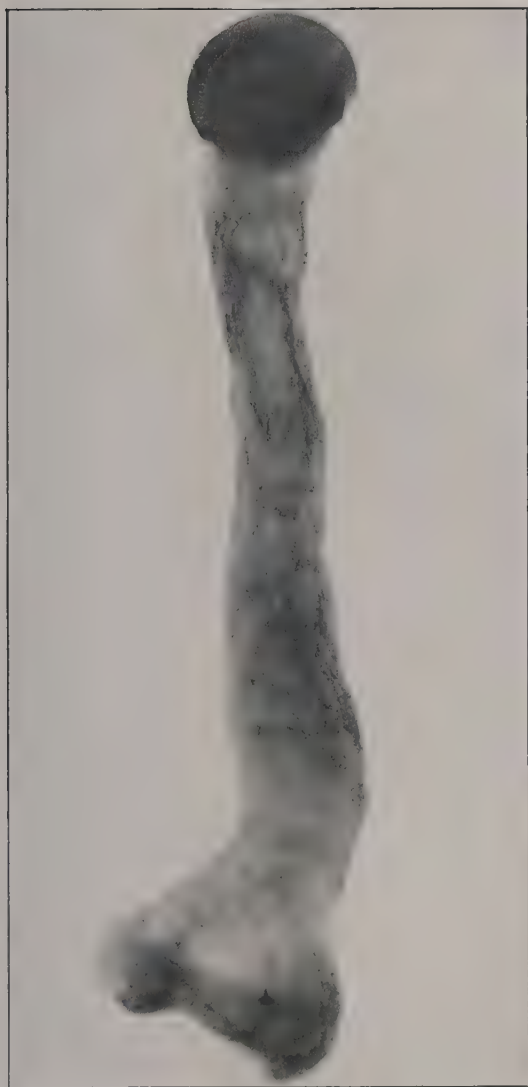


FIG. 175.
(Museum, Royal College of Surgeons of Edinburgh.)



FIG. 176.

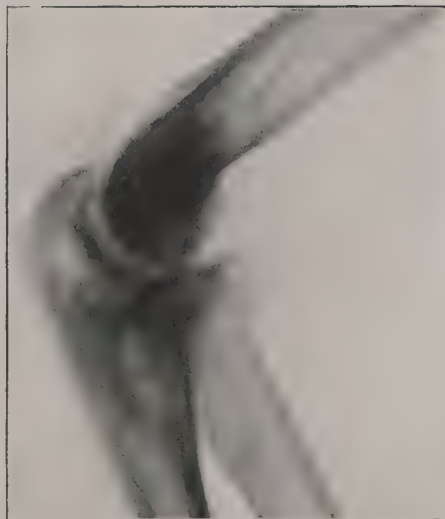


FIG. 177.

PLATE XLVI.

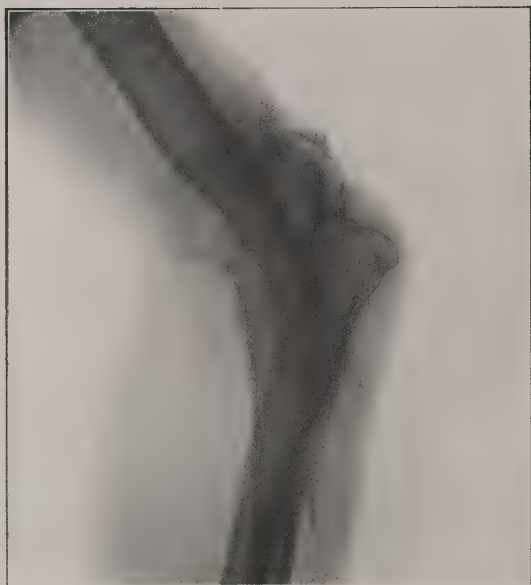


FIG. 178.

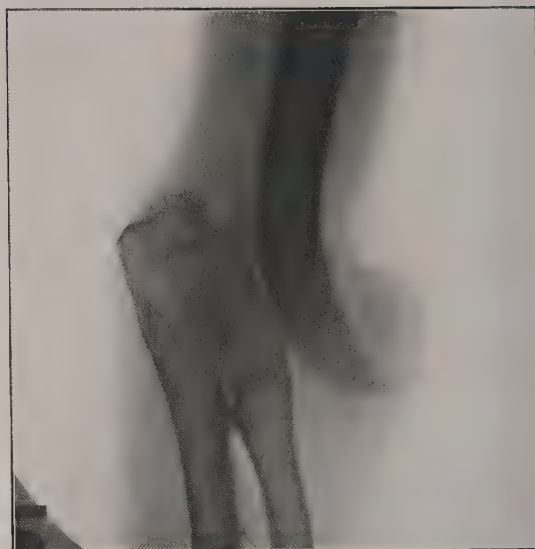


FIG. 179.

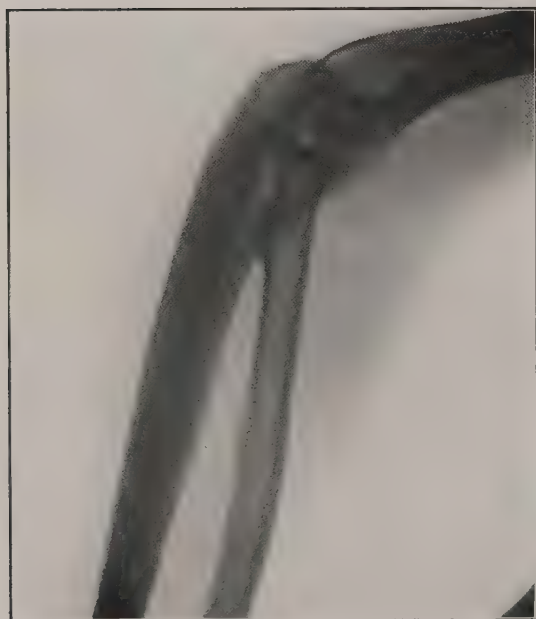


FIG. 180.



FIG. 181.

Plate XLVI. Figs. 178 and 179.

Good functional result of excision of the elbow joint, although the anatomical result appears poor. The patient has a "flail" elbow, but is earning full wages as a carpenter.

Plate XLVI. Fig. 180.

The patient has had an acute osteomyelitis of the proximal part of the ulna.

Plate XLVI. Fig. 181.

Forearm showing marked calcareous degeneration in the radial and ulnar arteries.

Plate XLVII. Fig. 182.

Osteitis fibrosa of the distal part of the radius.

Plate XLVII. Fig. 183.

Cystic disease of bone following a fall upon the thumb. A radiogram taken a week after the accident showed normal bone, but eventually cystic disease occurred throughout the whole limb. Bacterial examination of the bone medulla proved it to be sterile.

Plate XLVII. Fig. 184.

A tuberculous focus in the hamatum (os magnum) in a young person.

Plate XLVII. Fig. 185.

Calcification of atheromatous vessels. This condition was very marked in the original, the superficial palmar arch and its branches being easily recognisable.

PLATE XLVII.



FIG. 182.

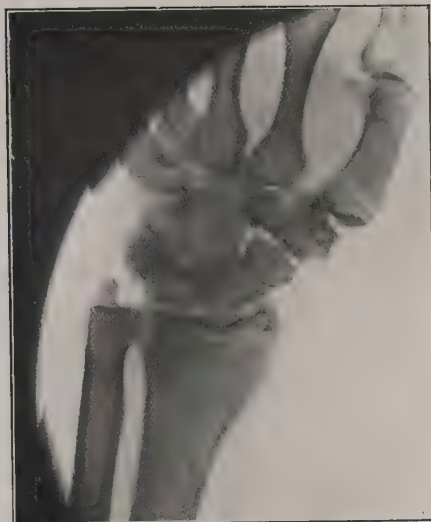


FIG. 183.



FIG. 184

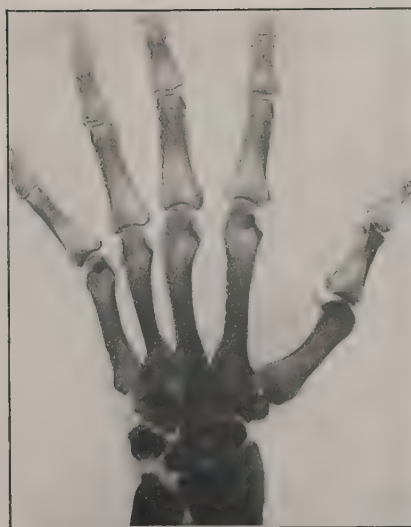


FIG. 185.

PLATE XLVIII.



FIG. 186.



FIG. 187.

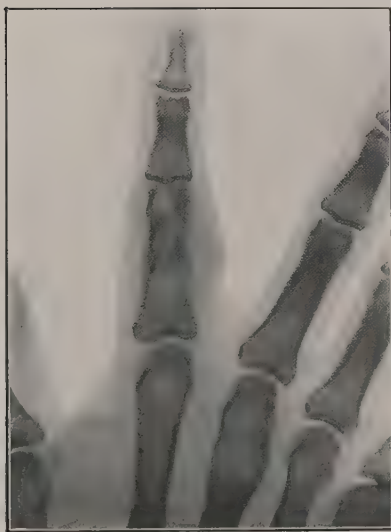


FIG. 188.



FIG. 189.

Plate XLVIII. Fig. 186.

Tuberculous dactylitis of the first phalanx of the index finger. This is a very chronic type, with more constructive than destructive changes in the diaphysis.

Plate XLVIII. Fig. 187.

Multiple tuberculous dactylitis. Note this is more acute than Fig. 186.

Plate XLVIII. Fig. 188.

Osteitis fibrosa cystica. Note the cystic changes in the first phalanx of the index finger, with disintegration not only of the cancellous but of the compact bone. Observe the periosteal new bone formation. The head of the middle metacarpal shows similar changes.

Plate XLVIII. Fig. 189.

Cystic degeneration in the second phalanx of the ring finger following trauma. The finger was caught by a falling window; screen examination the following day did not reveal any bone damage. The plate was taken on the tenth day after the accident.

Plate XLIX. Fig. 190.

Necrosis of the distal part of the terminal phalanx of the second finger due to a sub-periosteal whitlow.

Plate XLIX. Fig. 191.

Ossifying chondroma of the distal part of a metacarpal bone.
(Museum of the Royal College of Surgeons of Edinburgh.)

Plate XLIX. Fig. 192.

A romegaly. Note the club-shaped swelling of the terminal part of the distal phalanges, and the subperiosteal new bone formation.

Plate XLIX. Fig. 193.

A case of pulmonary osteo-arthritis.

PLATE XLIX.



FIG. 190.



FIG. 191.
(Museum, Royal College of Surgeons of Edinburgh.)



FIG. 192.



FIG. 193.

PLATE L.



FIG. 194.



FIG. 195.



FIG. 196.

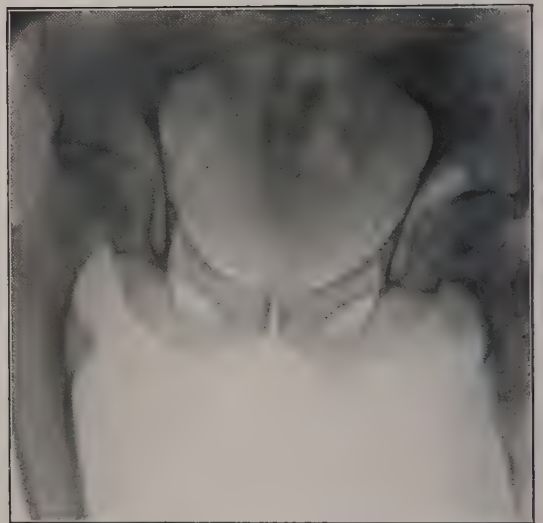


FIG. 197.

Plate L. Fig. 194.

Advanced chronic arthritis of a hypertrophic type (osteo-arthritis).

Plate L. Fig. 195.

A bilateral case of digitate thumb in an adult. One of the patient's children showed a similar anomaly. (Mr M'Killop, of Sydney.)

Plate L. Fig. 196.

Bony tumour springing from the ilium. Note that the tumour has been fractured across its base. X-ray a fortnight after the accident.

Plate L. Fig. 197.

Tuberculous disease commencing in the acetabulum.

Plate LI. Fig. 198.

Ankylosis of the hip joint resulting from old tuberculous disease.

Plate LI. Fig. 199.

Advanced tuberculous disease of the hip joint in an active condition.

Plate LI. Fig. 200.

A very chronic tuberculous abscess in the great trochanter of the femur.

Plate LI. Fig. 201.

Cystic disease of the proximal part of the shaft of the femur.

PLATE LI.

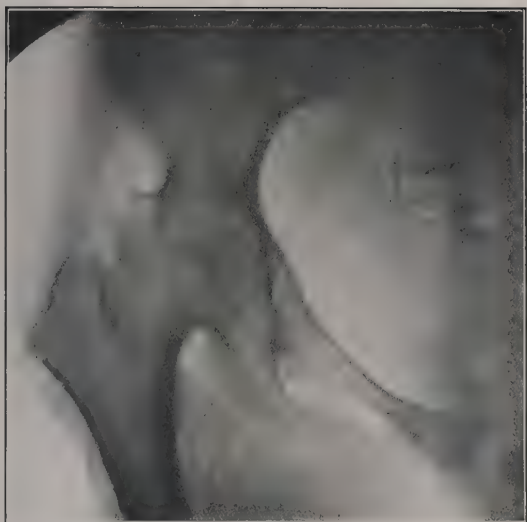


FIG. 198.



FIG. 199.



FIG. 200.

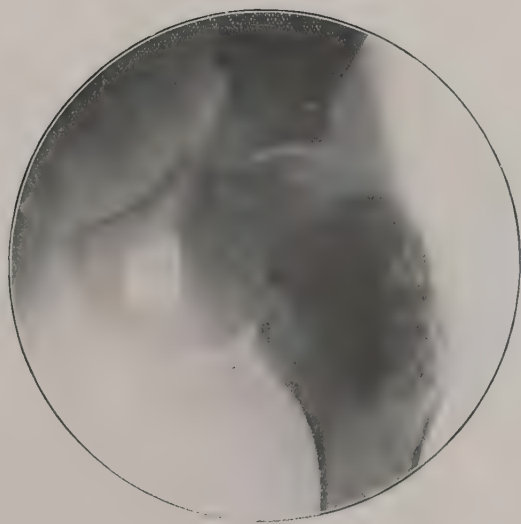


FIG. 201.

PLATE LII.

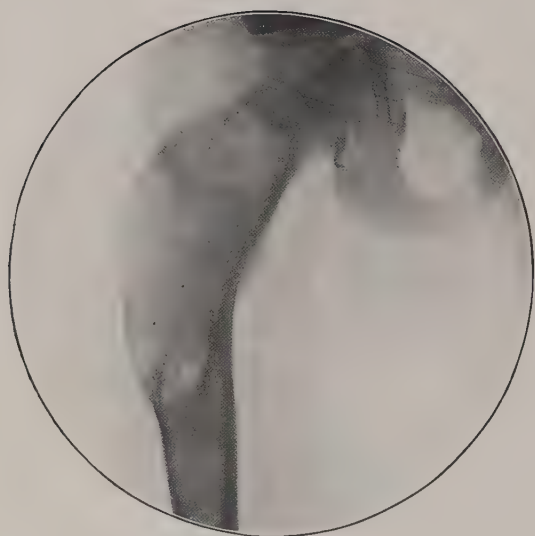


FIG. 202.

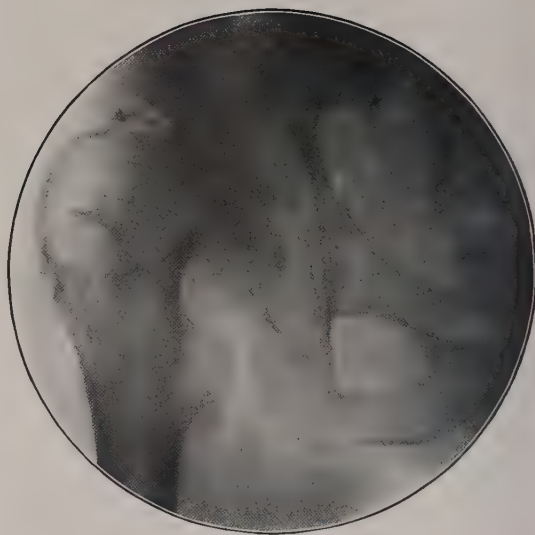


FIG. 203.



FIG. 204.



FIG. 205.

Plate LII. Fig. 202.

Cystic disease of the proximal part of the shaft of the femur.

Plate LII. Fig. 203.

Cystic condition of the great trochanter following "slid" epiphysis.

Plate LII. Fig. 204.

Old "slid" epiphysis. Note cystic change at tip of greater trochanter.

Plate LII. Fig. 205.

An old impacted fracture of the neck of the femur. Note the condensation of bone on the under surface of the neck along the lines of greatest stress.

Plate LIII. Fig. 206.

Ununited fracture of the neck of the femur of long standing.

Plate LIII. Fig. 207.

An ancient unreduced dislocation of the hip.

Plate LIII. Fig. 208.

Congenital dislocation of the left hip. Note the mal-development of the acetabulum and of the head of the femur.

Plate LIII. Fig. 209.

Old-standing congenital dislocation of the left hip. Note the conical shape and atrophy of the femoral head, also the shallow acetabulum.

PLATE LIII.



FIG. 206.



FIG. 207.



FIG. 208.

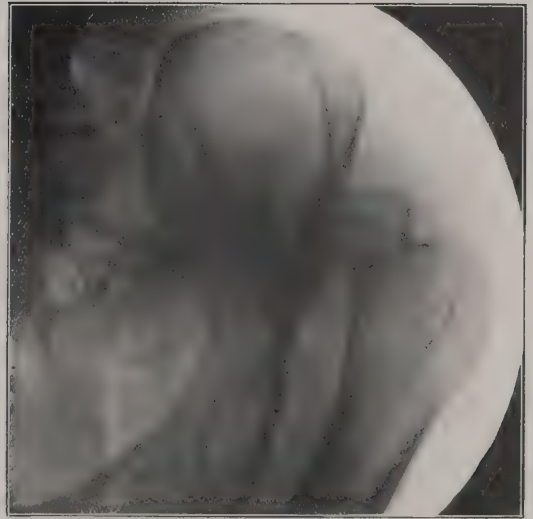


FIG. 209.

PLATE LIV.



FIG. 210.

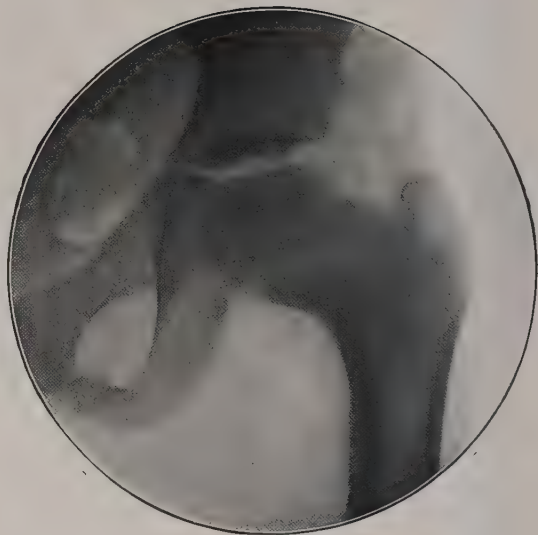


FIG. 211.

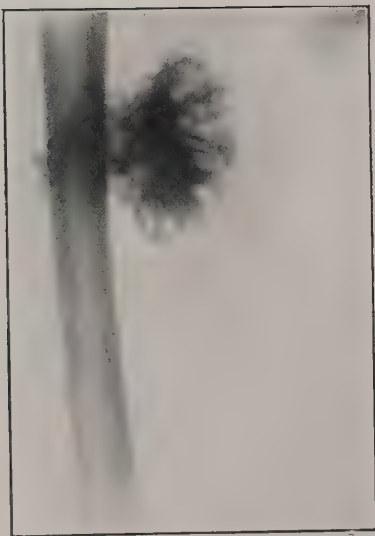


FIG. 212.

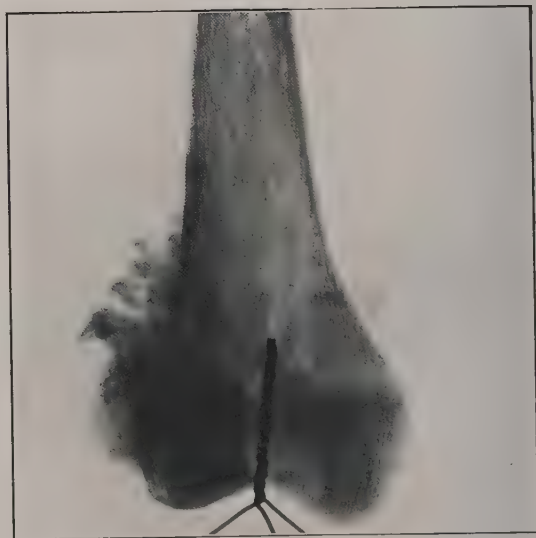


FIG. 213.

(Museum, Royal College of Surgeons of Edinburgh.)

Plate LIV. Fig. 210.

Pseudo-coxalgia (osteochondritis deformans of juveniles) of the right hip joint. Observe (i.) the flattening of the femoral head (coxa plana) with its attenuated margin creeping over the upper part of the neck; (ii.) the prominence of the great trochanter; (iii.) the broadening of the femoral neck; (iv.) the ragged edge of the acetabulum. During the active stage of the disease fragmentation of the ossific nucleus of the head occurs (see Plate CII., Fig. 381, in Appendix). Note that the lesion is most marked at the site of greatest weight-bearing.

Plate LIV. Fig. 211.

Pseudo-coxalgia in the left hip. Similar changes are seen as in the preceding figure.

Plate LIV. Fig. 212.

An ossifying chondroma on the shaft of the femur.

Plate LIV. Fig. 213.

An osteosarcoma of the distal end of the shaft of the femur. Note how the new bone is arranged at right angles to the surface.

(Museum of the Royal College of Surgeons of Edinburgh.)

Plate LV. Fig. 214.

An exostosis (cancellous osteoma) arising near the adductor tubercle of the femur.

Plate LV. Fig. 215.

Bony ankylosis following tuberculous disease of the knee joint.

Plate LV. Fig. 216.

Bony ankylosis of the knee joint. Note how, in accordance with Wolff's law, the internal architectural structure of the bones has been modified to the new requirements. The bony lamellæ at the convexity of the curve are markedly over-developed. The patella having lost its function has almost disappeared.

Plate LV. Fig. 217.

Acute osteomyelitis of the femur. Operation was performed three days after the onset of the disease. Observe how the periosteum has been irregularly raised from the cortex and new bone deposited.

PLATE LV.



FIG. 214.



FIG. 215.



FIG. 216.



FIG. 217.

PLATE LVI.



FIG. 218.

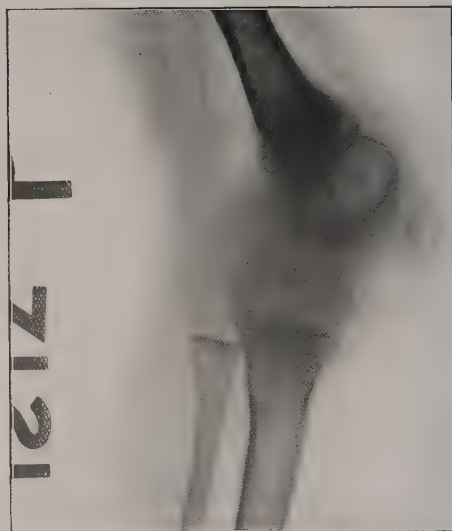


FIG. 219.



FIG. 220.



FIG. 221.

Plate LVI. Fig. 218.

Acute osteomyelitis of the femur. The elevated periosteum is becoming ossified to form an involucrum.

Plate LVI. Fig. 219.

Tuberculous disease of the knee joint. Note the osteoporosis of the patella and the epiphyses.

Plate LVI. Fig. 220.

A case of gum valgum. Notice the compensatory changes in the arrangement of the bony lamellæ—condensation where the pressure is greatest, and rarefaction where the pressure is least.

Plate LVI. Fig. 221.

An early case of Schlatter's disease, which is an apophysitis of the tibial tubercle. Chronic inflammatory changes can be noticed in the lower part of the tongue-shaped portion of the upper tibial epiphysis. Observe the forward projection of the tibial tubercle.

Plate LVII. Figs. 222 and 223.

More advanced stages of Schlatter's disease.

Plate LVII. Fig. 224.

Knee joint, showing a spur upon the upper pole of the patella, with no obvious osteoarthritic changes in the joint. Notice the sesamoid bone of the gastrocnemius muscle.

Plate LVII. Fig. 225.

Advanced chronic arthritis of a hypertrophic type (osteoarthritis). The marked lipping of the articular edges is well shown. Observe the osteocartilaginous loose body in front of the femoral trochlear surface, and the peculiar rarefaction of the patella.

PLATE LVII.



FIG. 222.



FIG. 223.



FIG. 224.



FIG. 225.

PLATE LVIII.



FIG. 226.

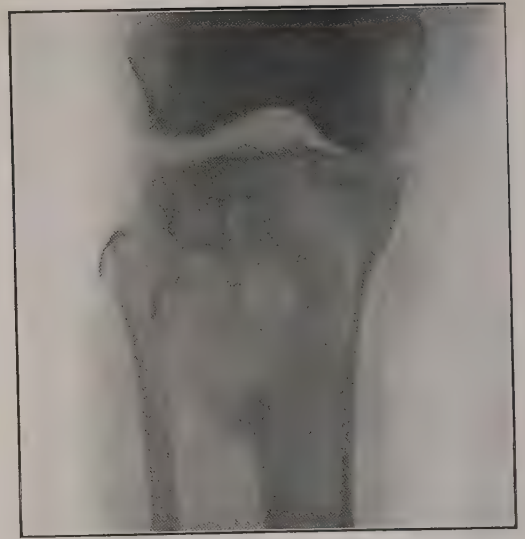


FIG. 227.



FIG. 228.



FIG. 229.

Plate LVIII. Fig. 226.

Hæmarthrosis of the knee joint due to hæmophilia. Organisation of the blood clot can be seen, especially in the suprapatellar bursa. Other parts of the joint show changes similar to those of early osteoarthritis.

Plate LVIII. Fig. 227.

Myeloma of the proximal end of the tibia. An antero-posterior view.

Plate LVIII. Fig. 228.

A lateral view of a myeloma of the upper end of the tibia.

Plate LVIII. Fig. 229.

Myeloma of the upper end of the tibia after operation.

Plate LIX. Fig. 230.

Ossifying chondromata of the proximal ends of the tibia and fibula.

Plate LIX. Fig. 231.

Brodie's abscess in the head of the tibia. Note the zone of sclerosis around the greater part of the circumference of the abscess.

Plate LIX. Fig. 232.

Tuberculous periostitis of the tibia. The erosion is saucer-shaped, due to the granulation tissue.

Plate LIX. Fig. 233.

Osteitis deformans (Paget's disease of bone) of the tibia. Observe the antero-posterior curving of the bone, and the increased density of the latter.

PLATE LIX.



FIG. 230.



FIG. 231.

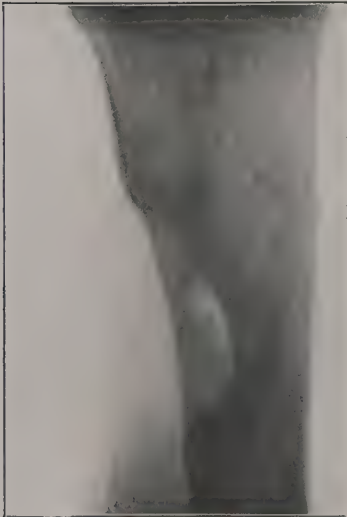


FIG. 232.



FIG. 233.

PLATE LX.



FIG. 234.

(Museum, Royal College of Surgeons of Edinburgh.)

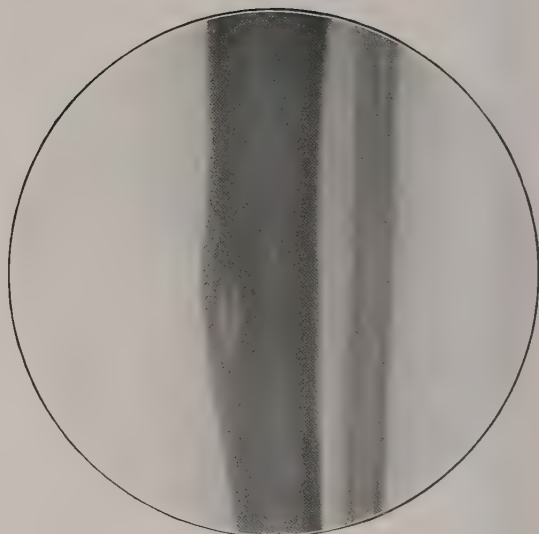


FIG. 235.



FIG. 236.

Plate LX. Fig. 234.

Old case of osteitis fibrosa of the tibia. Note the curvature of the lower two-thirds of the bone, also the changes due to alteration of the calcium metabolism, some areas showing decalcification and others excessive calcification.

(Museum of the Royal College of Surgeons of Edinburgh.)

Plate LX. Fig. 235.

A syphilitic sequestrum in the shaft of the tibia.

Plate LX. Fig. 236.

Syphilitic disease of the distal end of the fibula

Plate LXI. Fig. 237.

Periosteal sarcoma of the shaft of the fibula. Note the irregular spicules of bone arranged at right angles to the long axis of the bone.

(Museum of the Royal College of Surgeons of Edinburgh.)

Plate LXI. Fig. 238.

Syphilitic periostitis of the bones of the leg. (Mr A. P. Bertwistle.)

Plate LXI. Fig. 239.

Kohler's disease, *i.e.*, tarsal scaphoiditis in a young child. Note the increased density of the ossific centre of the scaphoid (navicular).

Plate LXI. Fig. 240.

A lateral view of the preceding figure. Observe the antero-posterior shortening of the scaphoid (navicular).

PLATE LXI.

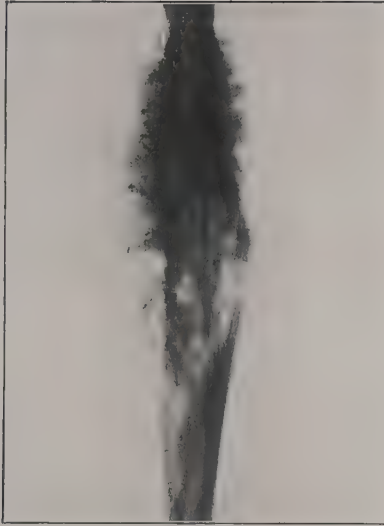


FIG. 237.

(Museum, Royal College of Surgeons of Edinburgh.)



FIG. 238.



FIG. 239.

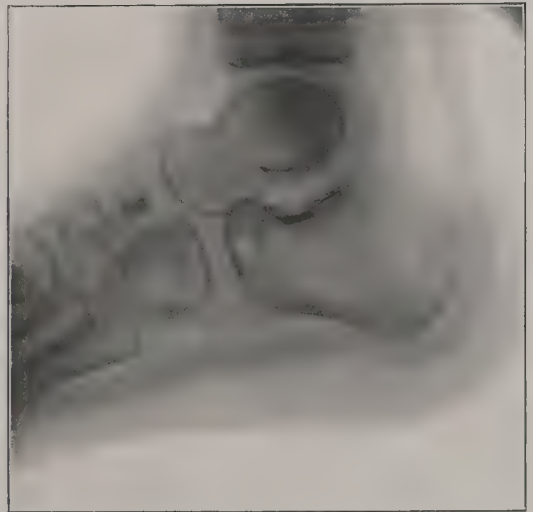


FIG. 240.

PLATE LXII.

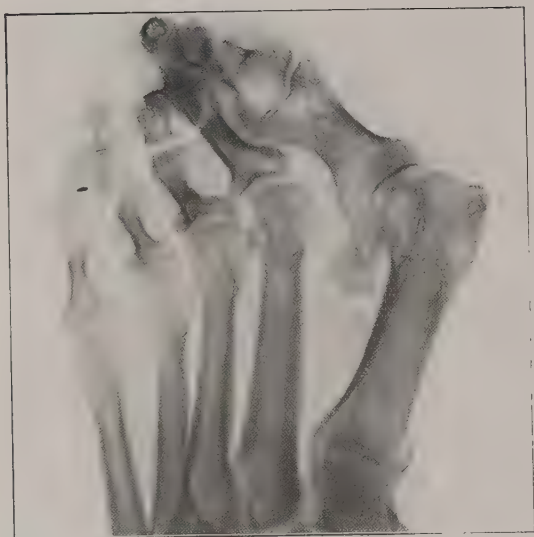


FIG. 241.



FIG. 242.
(Museum, Royal College of Surgeons of Edinburgh.)



FIG. 243.

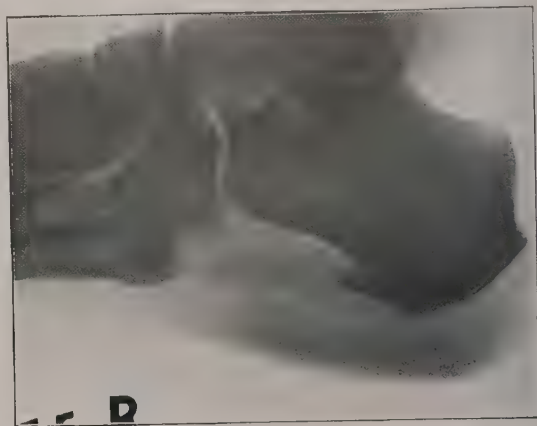


FIG. 244.

Plate LXII. Fig. 241.

A marked degree of hallux valgus is present. Osseous changes caused by chronic arthritis of a hypertrophic type are seen in the head of the first metatarsal.

Plate LXII. Fig. 242.

Hallux varus. This radiogram presents many interesting features. Observe (*a*) the mesial displacement of the hallux; (*b*) adduction of the first metatarsal; (*c*) the presence of an accessory hallux with its metatarsal and phalanges; (*d*) duplication of the first cuneiform; (*e*) an accessory navicular is apparently present; (*f*) abduction of the distal half of the shaft of the fourth metatarsal; and (*g*) articulation of the shafts of the third and fourth metatarsals.

(Mr D. M. Greig.)

Plate LXII. Fig. 243.

Spur on the inferior surface of the calcaneus.

Plate LXII. Fig. 244.

Spur on the inferior surface of the calcaneus.

Plates LXIII. and LXIV. Figs. 245-252.

Examples of achondroplasia in an adult. In achondroplasia the shafts of the long bones are stunted in length but increased in width. A certain degree of curvature of these bones is often found.

Note (*a*) the irregular projections due to subperiosteal overgrowths; (*b*) the epiphyseal areas in this patient are slightly enlarged, and a marked increase in size will be observed at the extremities of the diaphyses, *i.e.*, in the metaphyseal regions of the growing bone; and (*c*) a tendency towards cystic formation in several of the bones

PLATE LXIII.



FIG. 245.



FIG. 246.



FIG. 247.

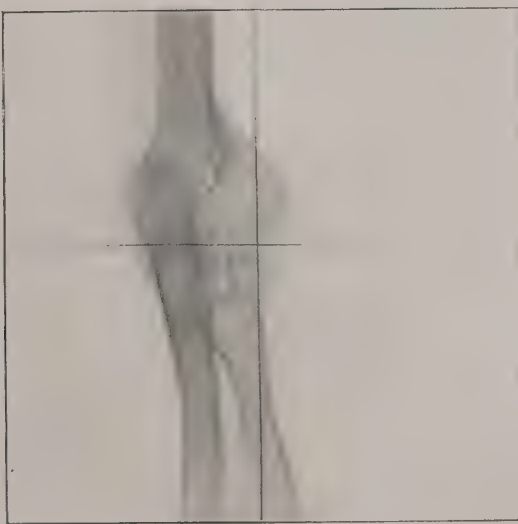


FIG. 248.

PLATE LXIV.

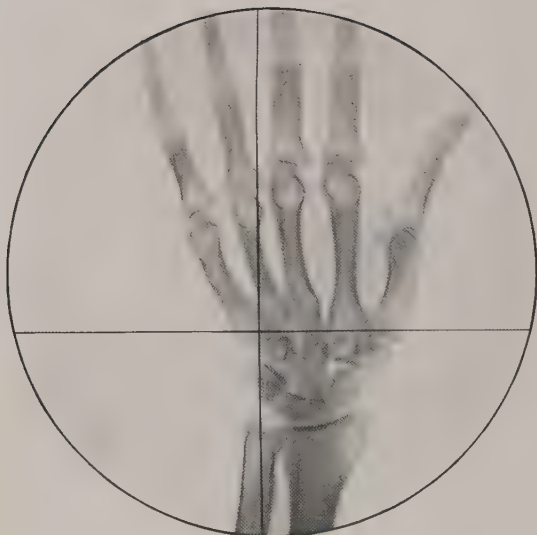


FIG. 249.



FIG. 250

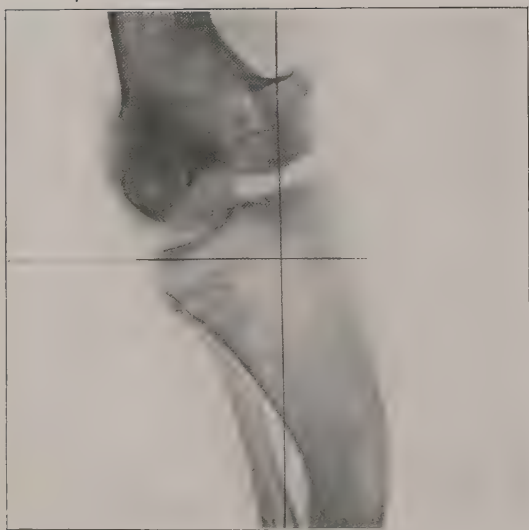


FIG. 251.

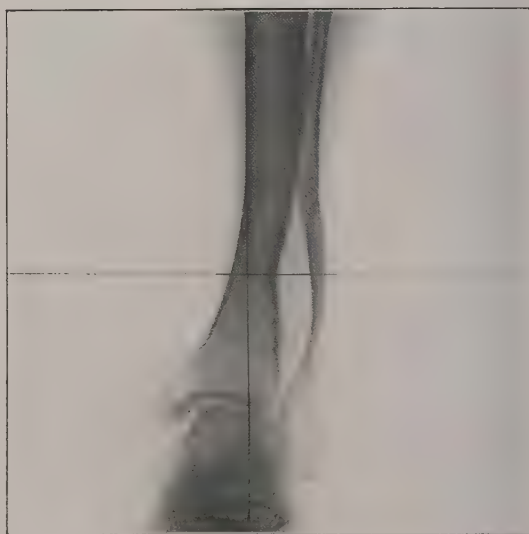


FIG. 252.

HEAD, NECK, THORAX, AND SPINE

Plate LXV. Fig. 253

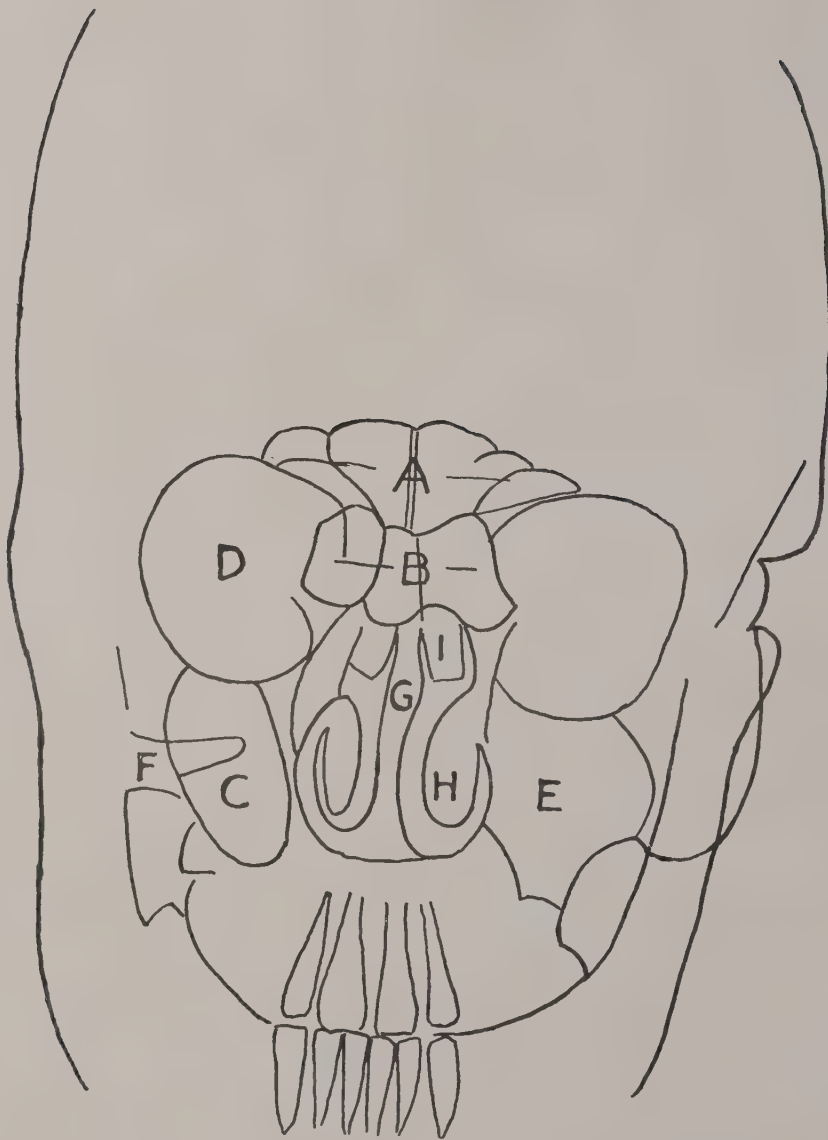


DIAGRAM 17.—ANTERO-POSTERIOR VIEW OF ADULT SKULL.

- | | |
|----------------------|--------------------------------|
| A, Frontal sinuses. | E, Zygomatic bone. |
| B, Ethmoidal cells. | F, Transverse process of atlas |
| C, Maxillary antrum. | G, Nasal septum. |
| D, Orbit. | H, Inferior concha. |
| | I, Middle concha. |

PLATE LXV.



FIG. 253.

PLATE LXVI.



FIG. 254.

Plate LXVI. Fig. 254.

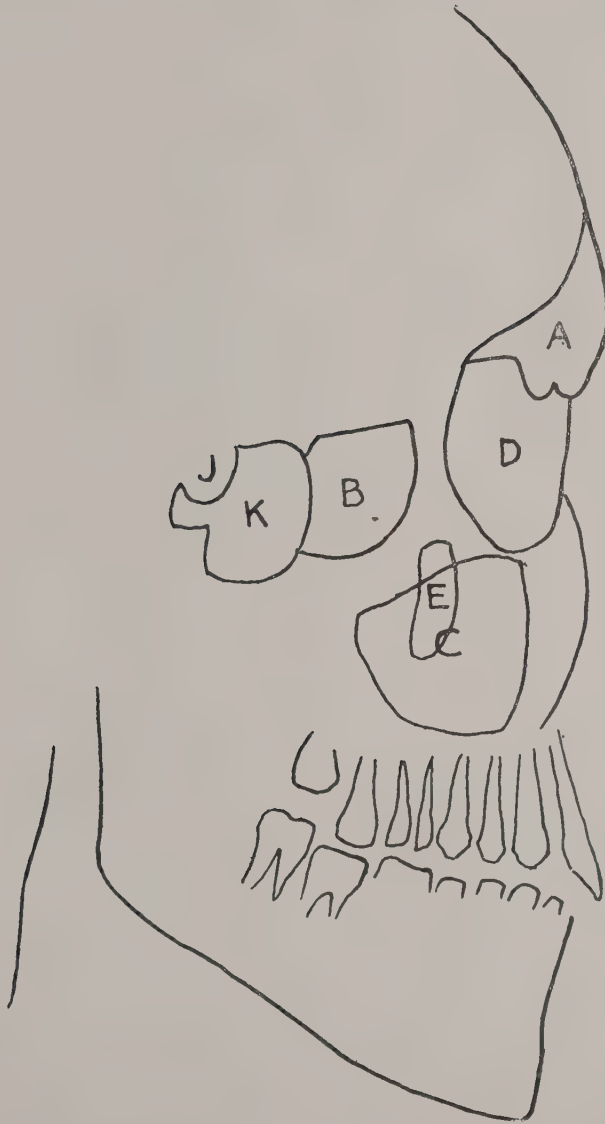


DIAGRAM 18.—LATERAL VIEW OF ADULT SKULL.

- | | |
|----------------------|---------------------|
| A, Frontal sinus. | D, Orbit. |
| B, Ethmoidal cells. | E, Zygomatic bone. |
| C, Maxillary antrum. | J, Pituitary fossa. |
| K, Sphenoidal sinus. | |

Plate LXVII. Fig. 255.

Fracture of the cranial vault. Note the clear area representing bone removed by operation

Plate LXVII. Fig. 256.

A depressed fracture of the cranial vault.

Plate LXVII. Fig. 257.

Sarcoma of the cranial vault. Observe the thinning of all the bones of the skull, except posteriorly, where the tumour shows densely.

Plate LXVII. Fig. 258.

This is the best position for showing disease or injury of the body of the mandible. The plate is held against the side of the face and the head approximated as far as possible to the shoulder. The X-ray tube is focused so as to throw its rays upwards through the floor of the mouth.

PLATE LXVII.



FIG. 255.

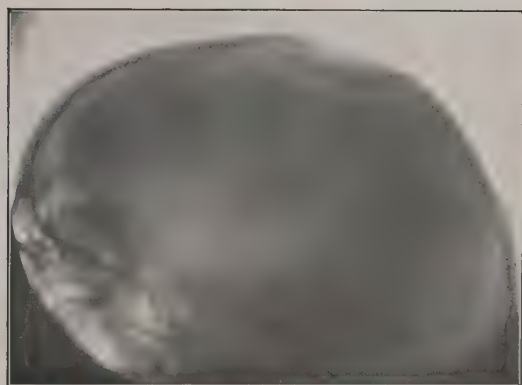


FIG. 256.



FIG. 257.



FIG. 258.

PLATE LXVIII.



FIG. 259.



FIG. 260



FIG. 261.

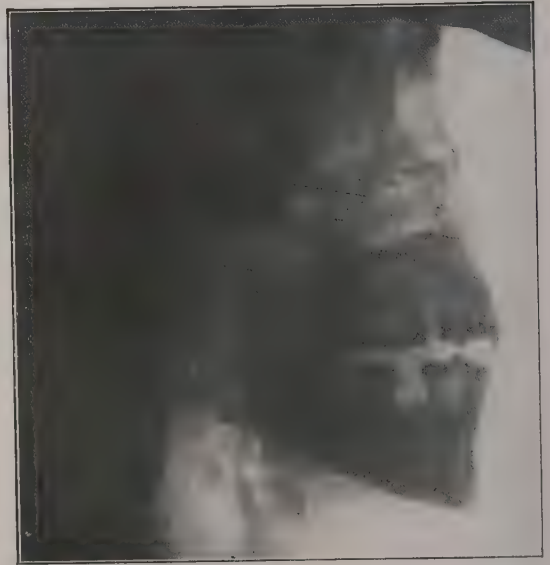


FIG. 262.

Plate LXVIII. Fig. 259.

Fracture of the mandible near the angle. (Mr T. B. Patterson.)

Plate LXVIII. Fig. 260.

Fracture through the body of the mandible at the commonest site.

Plate LXVIII. Fig. 261.

Unerupted wisdom tooth.

Plate LXVIII. Fig. 262.

Unerupted wisdom tooth. (Mr T. B. Patterson.)

Plate LXIX. Fig. 263.

Epithelial odontome (multilocular cystic tumour of Eve). Note the great expansion of the body of the mandible, and the numerous bony trabeculæ ramifying through the tumour. (Museum of the Royal College of Surgeons of Edinburgh.)

Plate LXIX. Fig. 264.

Follicular odontome. Note the partially developed tooth in the cyst (clear area). The wall of the cyst represents the expanded tooth follicle.

Plate LXIX. Fig. 265.

Follicular odontome at an earlier stage than the preceding figure.

Plate LXIX. Fig. 266.

Follicular odontome of large size. The greater part of the wall consisted of tough fibrous tissue. (Museum of the Royal College of Surgeons of Edinburgh.)

PLATE LXIX.



FIG. 263.
(Museum, Royal College of Surgeons of Edinburgh.)



FIG. 264.



FIG. 265.



FIG. 266.
(Museum, Royal College of Surgeons of Edinburgh.)

PLATE LXX.

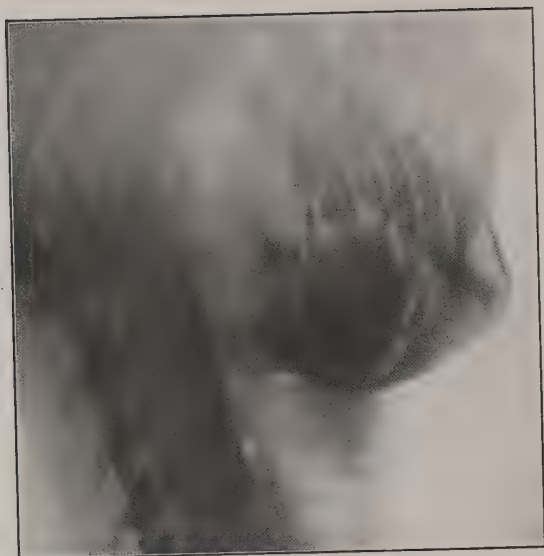


FIG. 267.



FIG. 268.

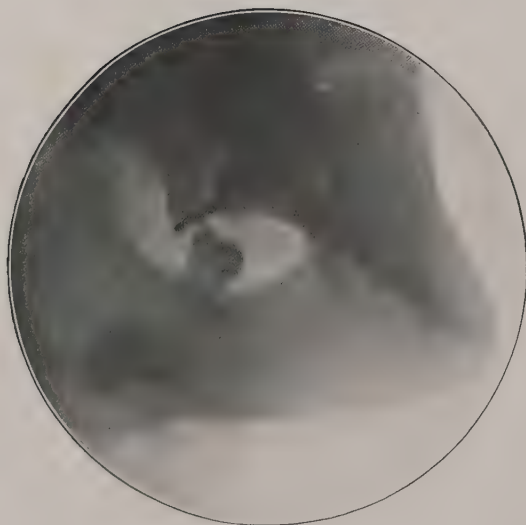


FIG. 269.

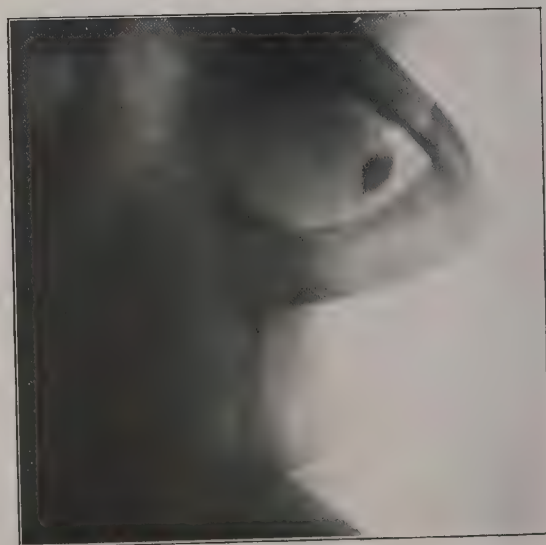


FIG. 270.

Plate LXX. Fig. 267.

Radicular odontome.

Plate LXX. Fig. 268.

Cyst of the mandible.

Plate LXX. Fig. 269.

Salivary calculus in the submaxillary duct.

Plate LXX. Fig. 270.

Salivary calculus.

Plate LXXI. Fig. 271.

Acute osteomyelitis of the mandible. (Edinburgh Dental Hospital.)

Plate LXXI. Fig. 272.

Epithelioma of the mandible. (Edinburgh Dental Hospital.)

Plate LXXI. Fig. 273.

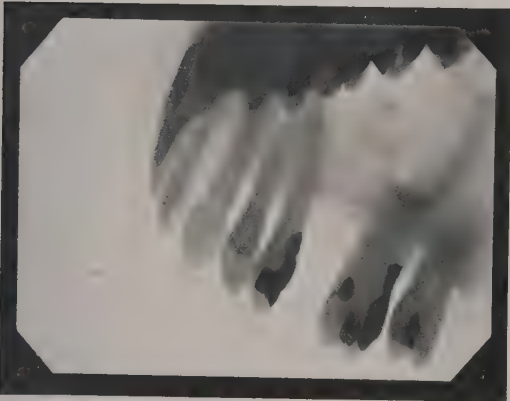
- (a) Empyema of antrum (taken intraorally).
- (b) Advanced pyorrhœa. Note only the tips of the roots in the alveolus.
- (c) Normal antrum. The same case as (a), but the other side of the mouth.
- (d) Abscess at the root of the first premolar (clear area at apex).



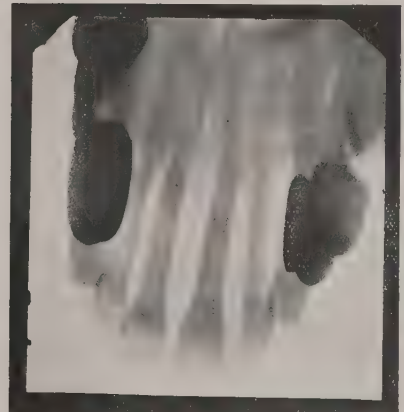
FIG. 271.



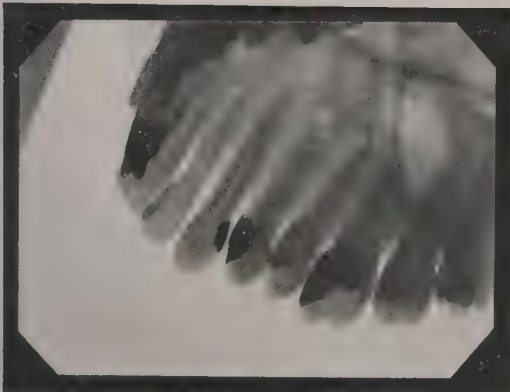
FIG. 272.



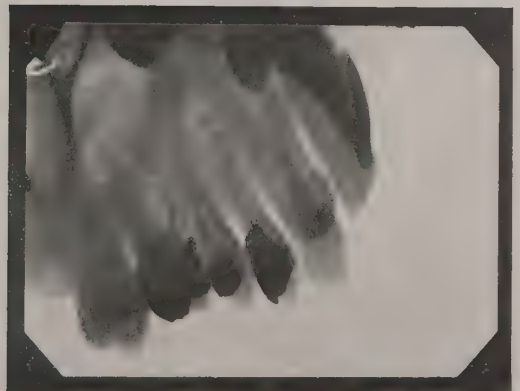
(a)



(b)



(c)

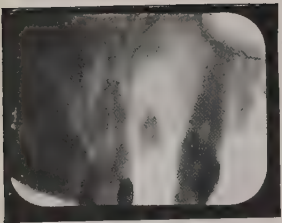


(d)

FIG. 273.

PLATE LXXI^A.

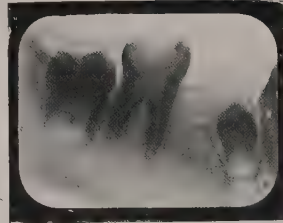
FIG. 273.



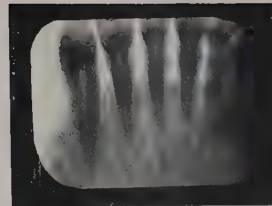
(e)



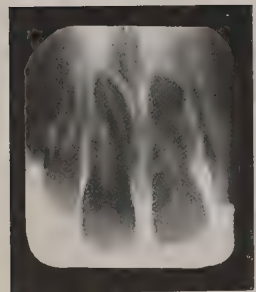
(f)



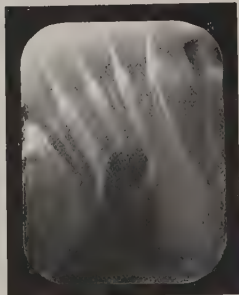
(g)



(h)



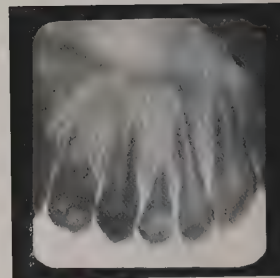
(i)



(j)



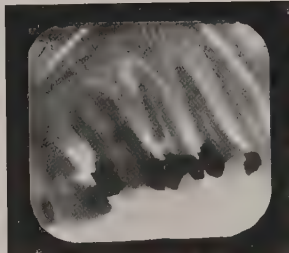
(k)



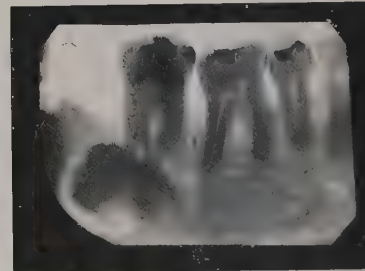
(l)



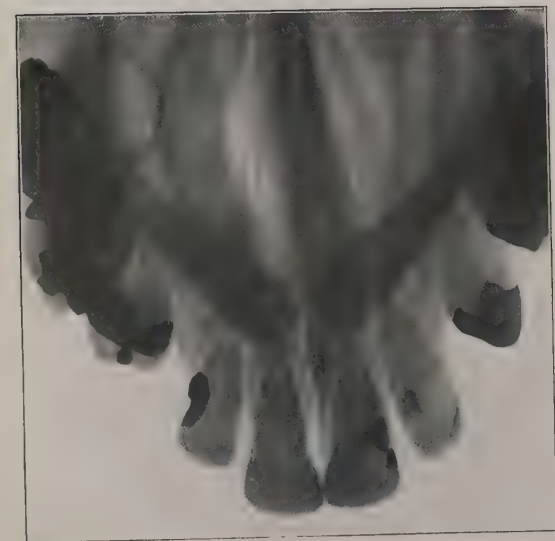
(m)



(n)



(o)



(p)



(q)

Plate LXXIA. Fig. 273.

(*e*) Maxillary lateral incisor root with large abscess (clear area) and rarefaction of the adjacent bone (mottled area).

(*f*) Impacted partially developed mandibular third molar.

(*g*) Developing first premolar and second molar, with absence of second premolar.

(*h*) Moderate degree of pyorrhœa alveolaris. Note the disappearance of the free edges of the interdental septa and rarefaction of what remains. Excrescences at the neck of the teeth caused by subgingival tartar. (Mr J. H. Gibbs.)

(*i*) Two inverted supernumerary teeth discovered accidentally. (Mr J. H. Gibbs.)

(*j*) Impacted and displaced left mandibular canine. (Mr J. H. Gibbs.)

(*k*) Longitudinal fracture of maxillary central incisor. (Mr J. H. Gibbs.)

(*l*) Absence of certain permanent teeth and retention of milk ones. From right to left—central and lateral incisors, milk canine, permanent canine, milk molar, permanent molar—both premolars absent. Left maxilla. (Mr J. H. Gibbs.)

(*m*) Patient had a discharging mandibular sinus for several years. Note the large abscess (clear area) with an irregular sequestrum (inside the clear area). (Mr J. H. Gibbs.)

(*n*) Left maxilla showing several pathological conditions. The patient has marked pyorrhœa, and the radiogram shows destruction of the interdental septa, especially between the two molars where there is a deep pocket (clear area). There is a carious cavity in the front of the second molar between the filling and the gum. Note the sinus over the roots of this tooth, and also on the root of the second premolar, the bone at the apex of which is seen to be rarefied. (Mr J. H. Gibbs.)

(*o*) Left mandible. Impacted third molar under second molar, with crown pointing backwards, and marked rarefaction of root and bone (clear areas). Disabling neuralgia of ten years' duration completely disappeared soon after removal of tooth. (Mr J. H. Gibbs.)

(*p*) Unerupted malposed maxillary canines.

(*q*) Right maxilla showing two dental cysts (clear area), one involving apices of central incisors, the other much larger, in premolar region. Note the nasal fossa above and the maxillary sinus behind. All the teeth have crowns, and the mid-portion of the root of the canine shows rarefaction. (Mr J. H. Gibbs.)

Plate LXXII. Fig. 274.

Right sphenoidal sinus packed with opaque gauze.

Plate LXXII. Fig. 275.

Right sphenoidal sinus packed with opaque gauze. The head is in the left oblique position. The gauze can be seen through the right orbit.

Plate LXXII. Fig. 276.

A left oblique view of the right sphenoidal sinus packed with opaque gauze. Note the sphenoidal sinus seen through the left orbit.

Plate LXXII. Fig. 277.

A direct lateral view of the right sphenoidal sinus filled with opaque gauze.

PLATE LXXII.

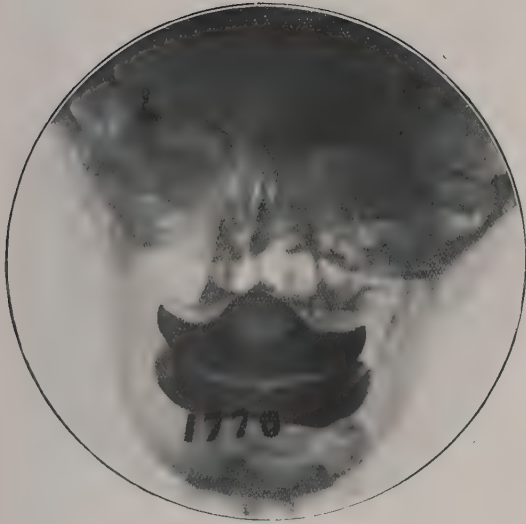


FIG. 274.

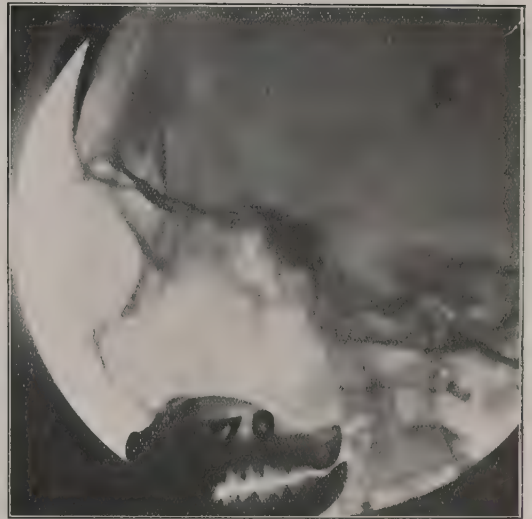


FIG. 275.

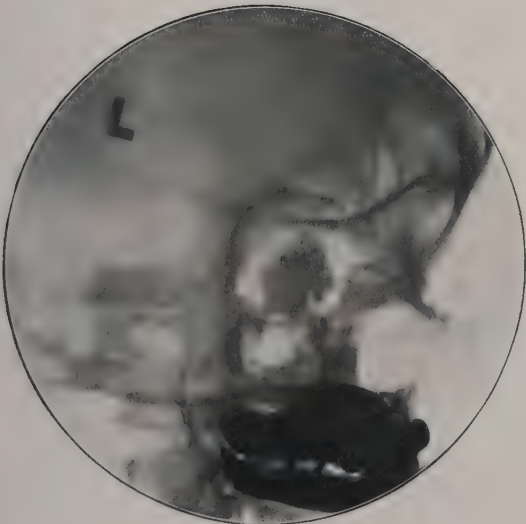


FIG. 276.

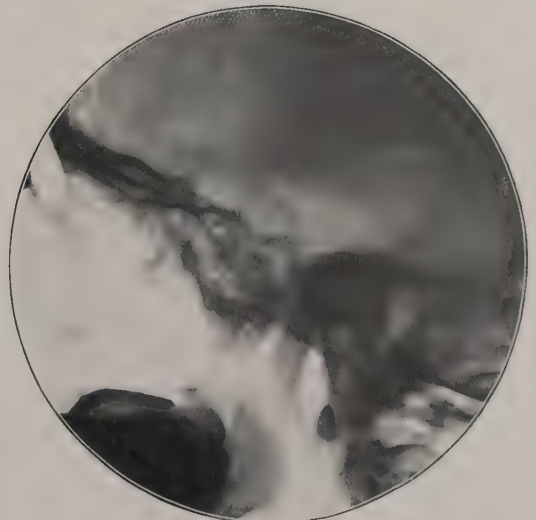


FIG. 277.

PLATE LXXIII.



FIG. 278.

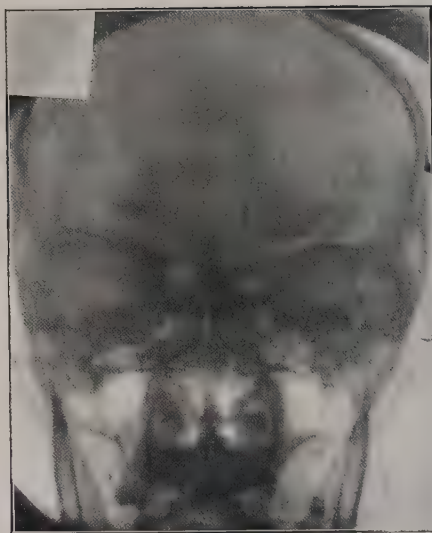


FIG. 279.

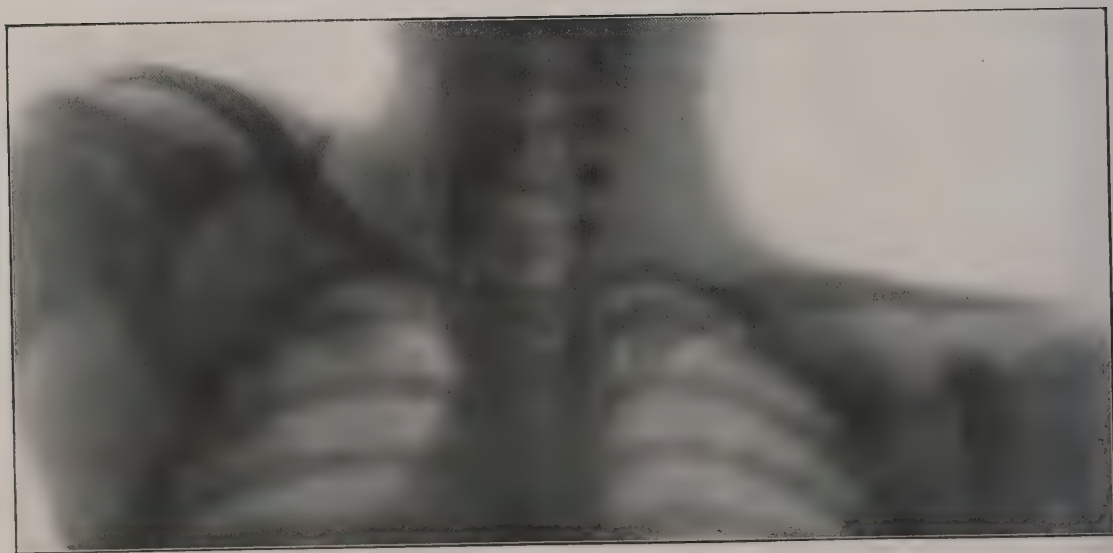


FIG. 280.

Plate LXXIII. Fig. 278.

Sinusitis of the right frontal, right ethmoids, and right maxillary antrum. The right choana is blocked by polypi.

Plate LXXIII. Fig. 279.

Very large frontal sinuses. Note the upper limit half-way between the vertex of the skull and the superior orbital margins.

Plate LXXIII. Fig. 280.

Congenital high scapula in a young female. Note the abnormal position of the left scapula and the obliquity of the clavicle. (Mr D. M. Greig.)

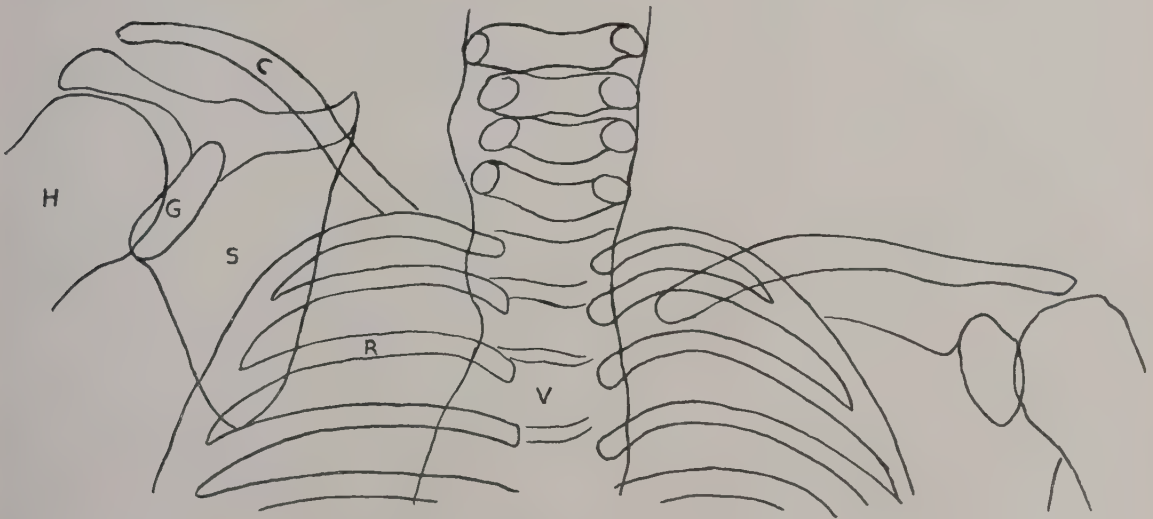


DIAGRAM 19.—CONGENITAL HIGH SCAPULA.

C, Clavicle.
S, Scapula.

G, Glenoid.
H, Humerus.

R, Ribs.
V, Vertebral column.

Plate LXXIV. Fig. 281.

Congenital high scapula on the left side in a male of eighteen years. In addition to the features seen in the preceding figure, observe (i.) a thickening of the superior angle of the scapula; (ii.) the presence of a bony mass, the base of which is in the lower cervical and upper thoracic regions, and whose apex is directed towards the middle of the vertebral border of the left scapula; (iii.) the irregular shape of the upper left ribs. (Mr D. M. Greig.)

PLATE LXXIV.



FIG. 281.

PLATE LXXV.



FIG. 282.

Plate LXXV. Fig. 282.

Rudimentary true cervical ribs.

Plate LXXVI. Fig. 283.

Lateral view of a case of brevicollis in a female aged five years. Note that "the cervical vertebræ are represented by a rod of bone only an inch in length and united at right angles with the atlas." (Mr D. M. Greig.)

Plate LXXVI. Fig. 284.

Lateral branchial fistula filled with bismuth. (Mr A. P. Bertwistle.)

PLATE LXXVI.



FIG. 283.



FIG. 284.

PLATE LXXVII.

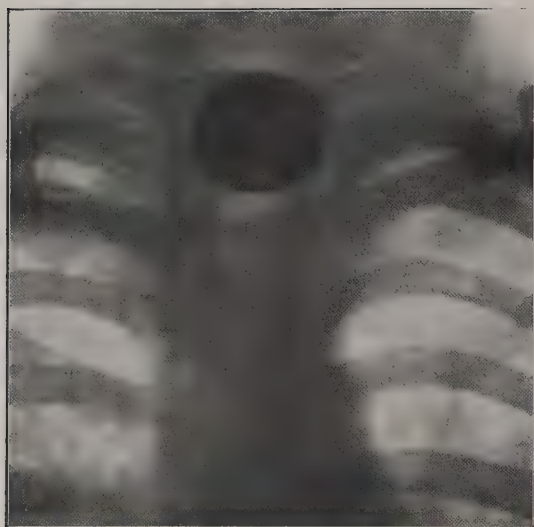


FIG. 285.



FIG. 286.

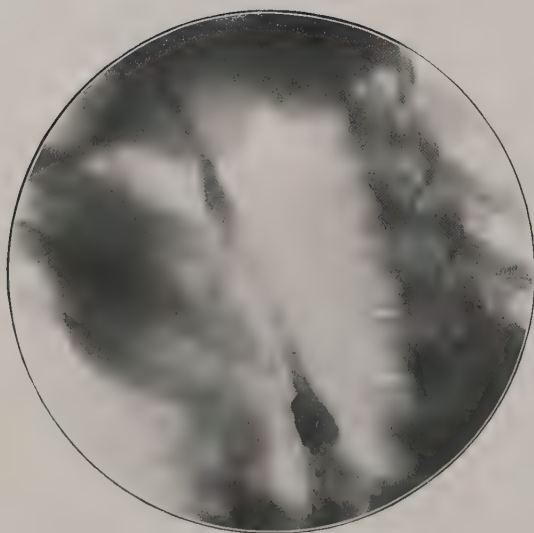


FIG. 287.



FIG. 288.

Plate LXXVII. Fig. 285.

A halfpenny impacted in the œsophagus.

Plate LXXVII. Fig. 286.

Pharyngeal diverticulum filled with bismuth.

Plate LXXVII. Fig. 287.

Œsophagus showing the effects of the swallowing of a caustic solution. Note the attenuation of the shadow due to general narrowing of the lumen.

Plate LXXVII. Fig. 288.

Malignant stricture of the œsophagus with dilatation of the tube above the level of the disease

Plate LXXVIII. Fig. 289.

The normal lumbar region of the vertebral column. Observe the outline of the psoas muscle.

Plate LXXVIII. Fig. 290.

A lumbo-sacral meningo-myelocoele in a child aged seven days. 35 c.cs. of cerebrospinal fluid have been replaced by 40 c.cs. of oxygen. Opposite the third lumbar vertebra the spinal cord curves backwards and enters the sac. Note several spinal nerves leaving the medullary area and traversing the sac. (Mr John Fraser.)

Plate LXXVIII. Fig. 291.

Healed fracture of the spine at the thoraco-lumbar junction.

Plate LXXVIII. Fig. 292.

In this radiogram observe the presence of an additional lumbar vertebra

PLATE LXXVIII.



FIG. 289.



FIG. 290.



FIG. 291.



FIG. 292.

PLATE LXXIX.



FIG. 293.



FIG. 294.



FIG. 295.

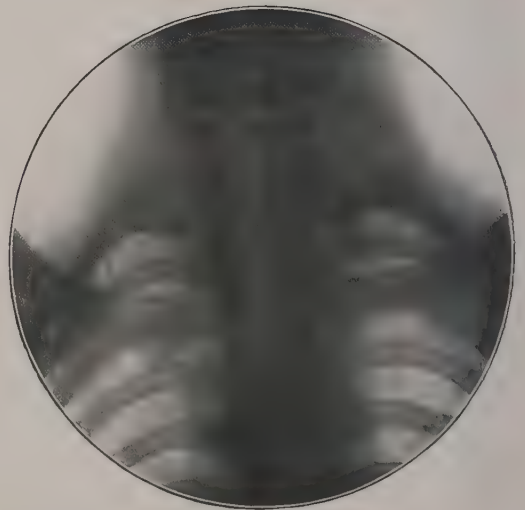


FIG. 296.

Plate LXXIX. Fig. 293.

One c.c. of lipiodol (poppy oil containing 40 per cent. of iodine) has been injected into the cisterna magna. The black shadow opposite the third lumbar spine indicates the upper level of an obstruction, usually a spinal tumour. (Mr W. Mercer.)

Plate LXXIX. Fig. 294.

Osteoarthritis of the cervical region of the vertebral column. Note the little spurs of new bone (osteophytes).

Plate LXXIX. Fig. 295.

Osteoarthritis of the lumbar region of the vertebral column.

Plate LXXIX. Fig. 296.

A bony mass implicating the three lower cervical vertebræ which resulted from a periostitis following trauma. (Mr W. Mercer.)

Plate LXXX. Fig. 297.

Spinal caries (Pott's disease) of the thoracic region. (Dr Hope Fowler.)

Plate LXXX. Fig. 298.

Pott's disease of the thoracic region with abscess formation. (Dr Hope Fowler.)

Plate LXXX. Fig. 299.

Pott's disease in the mid-thoracic region. Note the fusiform swelling due to abscess formation.

Plate LXXX. Fig. 300.

Consolidated fracture of the spine between the first and second lumbar vertebræ. Note the excess of callous formation.

PLATE LXXX.



FIG. 297.



FIG. 298.



FIG. 299.



FIG. 300.

PLATE LXXXI.

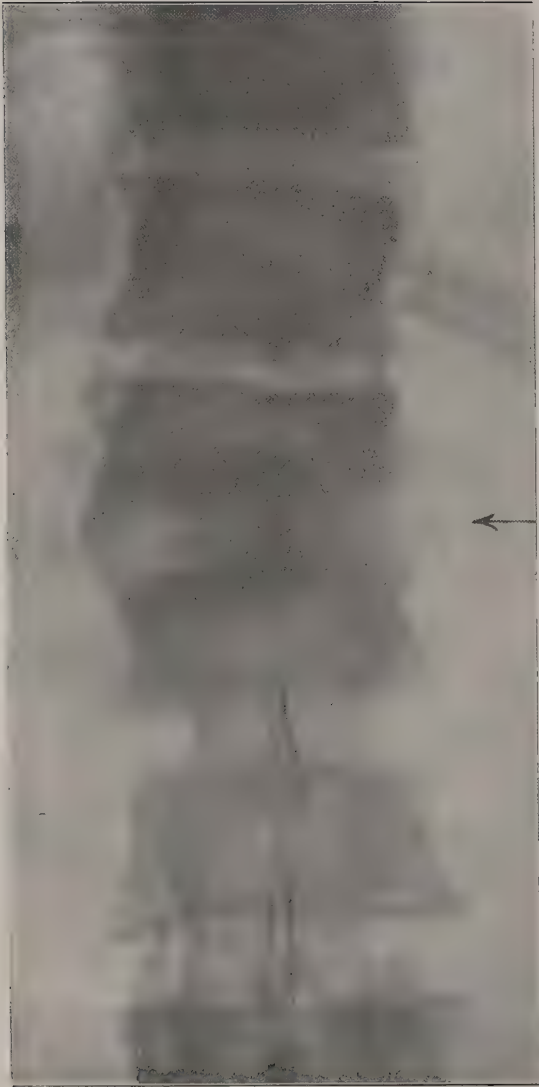


FIG. 301.



FIG. 302.



FIG. 303.

Plate LXXXI. Fig. 301.

Consolidated fracture of the spine between the first and second lumbar vertebræ. The patient was never off work on account of the fracture.

Plate LXXXI. Fig. 302.

Fracture of the spine between the third and fourth lumbar vertebræ.

Plate LXXXI. Fig. 303.

Fracture-dislocation of the spine between the third and fourth lumbar vertebræ.

Plate LXXXII. Fig. 304.

Fracture-dislocation at the junction of the first and second lumbar vertebræ with marked displacement

Plate LXXXII. Fig. 305.

Fracture-dislocation between the first and second lumbar vertebræ. (Dr Hope Fowler.)

Plate LXXXII. Fig. 306.

Compression fracture involving the third and fourth lumbar vertebræ. (Dr Hope Fowler.)

Plate LXXXII. Fig. 307.

Tuberculous disease of left lung (dark) with emphysema of right lung (light).

PLATE LXXXII.



FIG. 304.

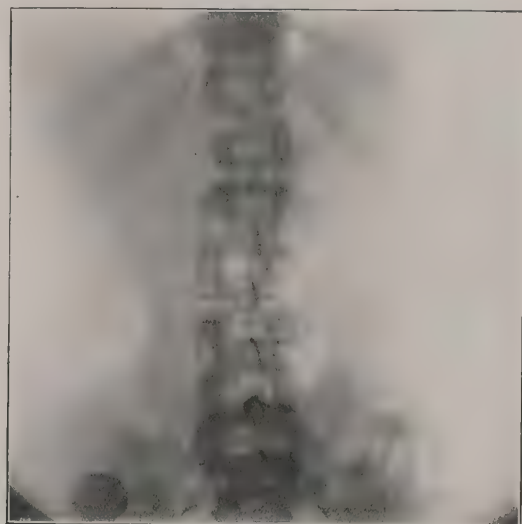


FIG. 305.

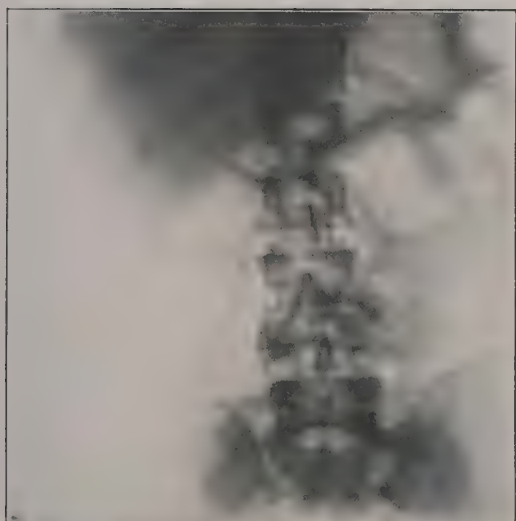


FIG. 306.

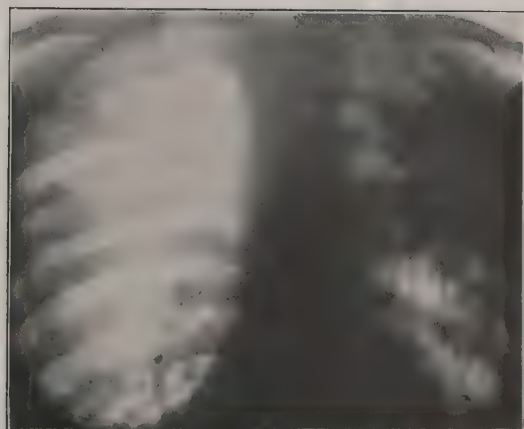


FIG. 307.

PLATE LXXXIII.



FIG. 308.



FIG. 309.



FIG. 310.

Plate LXXXIII. Fig. 308.

Aneurysm of the thoracic aorta without any physical signs or symptoms. The condition was discovered during the routine examination for life insurance.

Plate LXXXIII. Fig. 309.

Retro-sternal goitre. Note the trachea pushed to the right side. (Mr J. M. Graham.)

Plate LXXXIII. Fig. 310.

Hat-pin impacted in a bronchus

ABDOMEN

Plate LXXXIV. Fig. 311.

Good example of the normal appearance of a bismuth-filled stomach showing the cardia full of gas, the double incisure of the pyloric antrum, the duodenal cap, and almost the whole of the duodenum. (Dr Hope Fowler.)

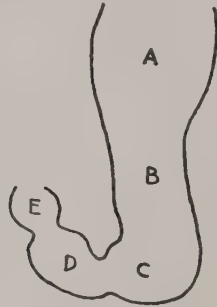


DIAGRAM 20.
NORMAL STOMACH.

- A, Cardia.
- B, Body.
- C, Pyloric antrum.
- D, Pyloric canal.
- E, Bulb.

Plate LXXXIV. Fig. 312.

An atonic stomach from a case of gastro- and entero-ptosis.

Plate LXXXIV. Fig. 313.

An hour-glass stomach due to cicatrix, plus spasm, with a niche ulcer on the lesser curvature opposite the incisura on the greater curvature. Note the very small channel between the cardiac and pyloric portions. (Dr Hope Fowler.)

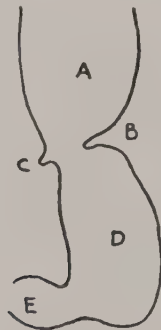


DIAGRAM 21.—HOUR-
GLASS STOMACH.

- A, Cardiac portion.
- B, Incisura.
- C, Niche ulcer.
- D, Pyloric portion.
- E, Pyloric canal.

Plate LXXXIV. Fig. 314.

An hour-glass stomach with the cardiac segment greatly distended. Only a trace of the bismuth has reached the pyloric portion.

PLATE LXXXIV.



FIG. 311.



FIG. 312.



FIG. 313.



FIG. 314.

PLATE LXXXV.



FIG. 315.



FIG. 316.



FIG. 317.

Plate LXXXV. Fig. 315.

An example of gastro- and entero-ptosis.

(i.) Note the long, pear-shaped, **J** stomach, with the lesser curvature below the line joining the uppermost limits of the iliac crests. (ii.) The same stomach in the recumbent posture. Here the greater curvature is raised well above the intercristal line. (iii.) Observe the delay brought about by the drag on the pylorus. (iv.) Taken in the recumbent posture. Note the ptosed colon; the cæcum, ascending colon, right colic flexure, and transverse colon are double-barrelled and lying in the right iliac fossa. (v.) The same patient in the upright posture at the end of forty-eight hours. (vi.) Recumbent posture. Observe the slight tendency of the colon to rise, but not sufficiently to bring about full recovery of the normal position. (Dr Hope Fowler.)

Plate LXXXV. Fig. 316.

Gastric ptosis with the patient in the upright position. There is a partial blockage of the pylorus from cicatrix. Note the rugæ in the cardiac end and body of the stomach.

Plate LXXXV. Fig. 317.

The same patient as in the preceding figure; recumbent posture. The appearance of cicatricial incisura is purely due to spasm; it can be modified by the palpating hand. (Dr Hope Fowler.)

Plate LXXXVI. Fig. 318.

An example of a visceroprotic stomach. The meal sank gradually down. On prone examination the viscus was seen to be absolutely perfect; emptying well and functioning normally. (Dr Hope Fowler.)

Plate LXXXVI. Fig. 319.

Exhibiting delay in the stomach, and in consequence small intestine stasis throughout and partial filling only of the cæcum. The greater part of the meal is in the lower coils of the ileum. (Dr Hope Fowler.)

Plate LXXXVI. Fig. 320.

Six hours after the giving of the bismuth meal there is a residue in the stomach and in the duodenum. A chronic duodenal ileus is present as described by Professor Wilkie. (Dr Hope Fowler.)

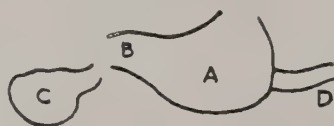


DIAGRAM 22.
CHRONIC DUODENAL ILEUS.

- A, Pyloric portion.
- B, Pyloric canal.
- C, Duodenal ileus.
- D, Transverse colon.

Plate LXXXVI. Fig. 321.

Taken in the recumbent posture with the patient lying on the back; the tube behind. This shows a faint outline of the duodenum, and on the mesial aspect of the second part of the duodenum the ampulla of Vater is seen bismuth-filled. This is diagnostic of a pathological gall-bladder with inspissated mucus and debris passing downwards. The identity disc is on the umbilicus. Note the cardiac end of the stomach, the pyloric portion, and the enlarged cap. Spastic coils of small intestine are visible to the right. (Dr Hope Fowler.)

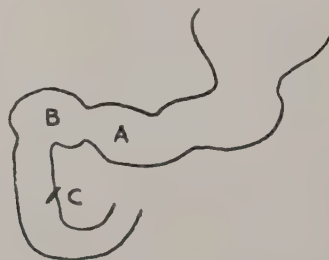


DIAGRAM 23.
AMPULLA OF VATER.

- A, Pyloric canal.
- B, Bulb.
- C, Ampulla of Vater.

PLATE LXXXVI.



FIG. 318.



FIG. 319.



FIG. 320.



FIG. 321.

PLATE LXXXVII.



FIG. 322.



FIG. 323.



FIG. 324.

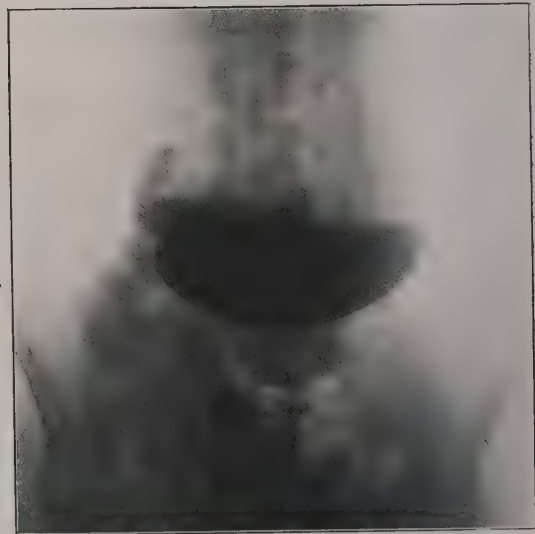


FIG. 325.

Plate LXXXVII. Fig. 322.

Modification of the pyloric antrum and cap by the pressure of a distended gall-bladder. At the same time there was a somewhat dilatable duodenum with a hitching-up near the duodeno-jejunal junction. There was a rapidly emptying stomach. The stomach was irritable and hyperperistaltic. The degree of irritability is seen in the radiogram. (Dr Hope Fowler.)

Plate LXXXVII. Fig. 323.

Modification of the duodenal cap from the pressure of a distended gall-bladder. (Dr Hope Fowler.)

Plate LXXXVII. Fig. 324.

This shows multiple gall-stones with a modification of the cap from a distended gall-bladder. All of the stones are not seen, as the gall-bladder was found at operation to be occupied by detritus as well as calculi. (Dr Hope Fowler.)

Plate LXXXVII. Fig. 325.

Modification of the duodenal cap due to a pathological gall-bladder containing a calculus. Operation because of this and an ulcer in the first part of the duodenum. (Dr Hope Fowler.)

Plate LXXXVIII. Fig. 326.

A gall-stone. (Dr Hope Fowler.)

Plate LXXXVIII. Fig. 327.

Gastro-jejunostomy complicated by stenosis of the stoma, and adhesion producing pouching of the stomach proximal to the stoma. (Dr Hope Fowler.)

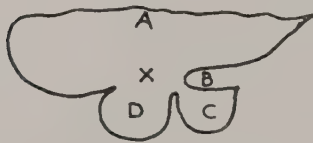


- A, Stomach pouch.
- B, Adhesion band.
- C, Pyloric segment.
- D, Stenosed stoma.
- E, Small intestines.

DIAGRAM 24.—GASTRO-JEJUNOSTOMY.

Plate LXXXVIII. Fig. 328.

Gastro-jejunostomy. Patient, an old duodenal ulcer case, was complaining of great pain over left hypochondrium. No jejunal ulcer. Operation removed adhesion across the jejunum. Pain continued, and is now considered to be due to adhesions dragging upon the solar plexus. (Dr Hope Fowler.)



- A, Stomach.
- B, Adhesion.
- C, Slightly dilated afferent portion of jejunum.
- D, Jejunal pouch below stoma.
- X, Stoma.

DIAGRAM 25.—GASTRO-JEJUNOSTOMY.

Plate LXXXVIII. Fig. 329.

Modification of the pyloric antrum with flattening of its upper border; a small niche in the first part of the duodenum. Diagnostic of an active duodenal ulcer. (Dr Hope Fowler.)

PLATE LXXXVIII.



FIG. 326.



FIG. 327.



FIG. 328.



FIG. 329.

PLATE LXXXIX.



FIG. 330.

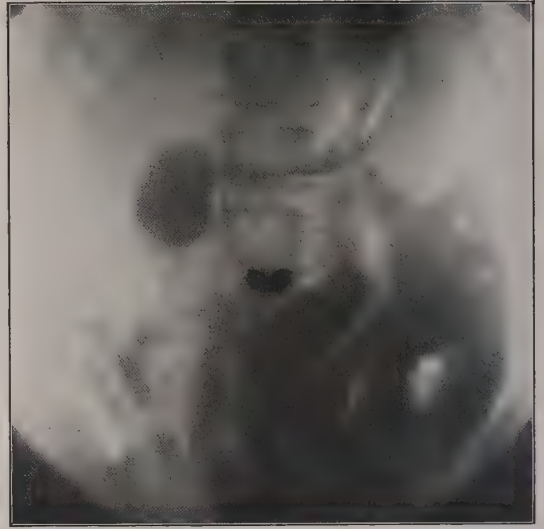


FIG. 331.

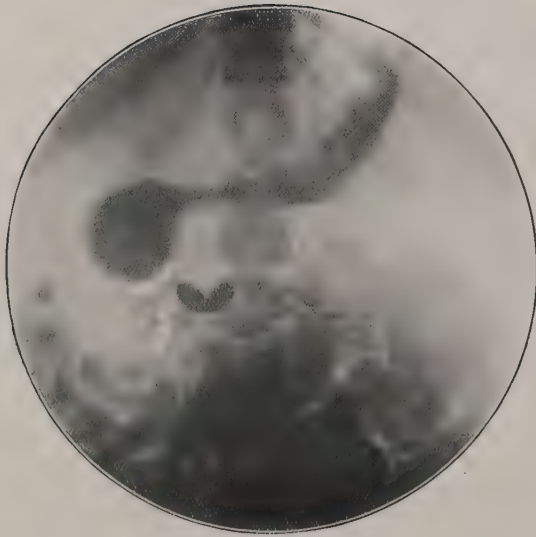


FIG. 332.



FIG. 333.

Plate LXXXIX. Fig. 330.

"Leather-bottle" stomach in the upright position. The meal passes straight through into the small intestine. (Dr Hope Fowler.)

Plate LXXXIX. Fig. 331.

"Leather-bottle" stomach in recumbent posture. The recumbent is similar to the upright, but printed the wrong way round. Note the absolute rigidity of the gastric wall. (Dr Hope Fowler.)

Plate LXXXIX. Fig. 332.

Another example of "leather-bottle" stomach. (Dr Hope Fowler.)

Plate LXXXIX. Fig. 333.

Carcinoma of the body of the stomach eroding the greater curvature.

Plate XC. Fig. 334.

Carcinoma of the body of the stomach affecting the greater curvature.

Plate XC. Fig. 335.

Shows a filling defect of the pyloric antrum. (Dr Hope Fowler.)

Plate XC. Fig. 336.

Modification of the duodenum in consequence of malignant involvement by cancer of the pyloric portion of the stomach. Inoperable. (Dr Hope Fowler.)

Plate XC. Fig. 337.

Deformity of the lower part of the body of the stomach from carcinoma: cardiac area of stomach is unaltered. The pyloric portion shows a marked filling defect, rigidity, and rapid emptying. The plate was taken within three minutes of the ingestion of the bismuth meal. (Dr Hope Fowler.)

PLATE XC.



FIG. 334.



FIG. 335.



FIG. 336.



FIG. 337.

PLATE XCI.

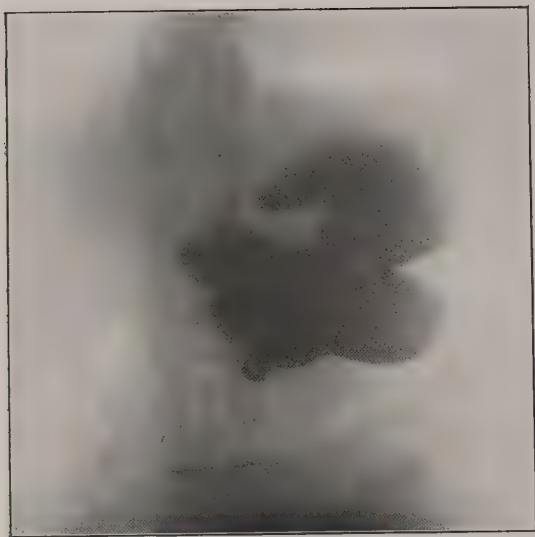


FIG. 338.



FIG. 339.



FIG. 340.



FIG. 341.

Plate XCI. Figs. 338 and 339.

Shows the same stomach in both upright and recumbent postures. Note the filling defect in the cardiac end. In the recumbent position the irregularity of the lateral wall of the cardia is seen, also the distension of the body of the stomach, together with the gas which comes in contact with the malignant structure and helps to show more clearly the degree of deformity. Inoperable. (Dr Hope Fowler.)

Plate XCI. Fig. 340.

An example of filling defect commonly seen in cancer of the stomach—in this case the pyloric portion of the viscus. There are traces of the meal outlining the modified pyloric antrum and the first and second parts of the duodenum. (Dr Hope Fowler.)

Plate XCI. Fig. 341.

Diverticulum seen to one side of the duodenum. Note the somewhat modified cap and the shot-like diverticulum. (Dr Hope Fowler.)

Plate XCII. Fig. 342.

Retro-peritoneal tumour modifying but not involving the body of the stomach. The tumour lies between the body of the stomach and the first part of the duodenum. (Dr Hope Fowler.)

Plate XCII. Fig. 343.

Retro-peritoneal tumour modifying the lateral margin of the greater curvature and the body of the stomach. The partially calcified wall of the tumour is clearly seen. Note the somewhat modified duodenal cap. The condition was verified by operation. (Dr Hope Fowler.)

Plate XCII. Fig. 344.

Distension of the whole of the duodenum from a retro-peritoneal tumour which had become adherent to the third part of the duodenum. Gall-stones were also present. (Dr Hope Fowler.)

Plate XCII. Fig. 345.

A case of fæcal stasis twenty-four hours after the administration of a bismuth meal. This is the same case as shown on Plate LXXXIV. Fig. 312.

PLATE XCII.



FIG. 342.



FIG. 343.

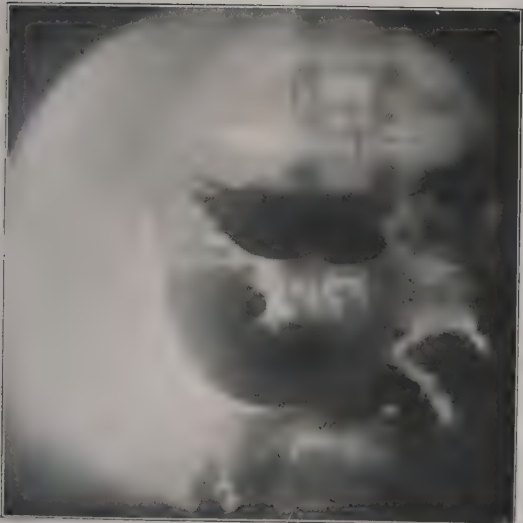


FIG. 344.



FIG. 345

PLATE XCIII.



FIG. 346.

Plate XCIII. Fig. 346.

The same patient as Fig. 345, forty-eight hours after the bismuth meal.

Plate XCIV. Fig. 347.

Multiple diverticulitis of the small intestine. Small round shrapnel-like diverticula are seen throughout the small intestine, which is otherwise somewhat spastic; the coils are rather dilated. (Dr Hope Fowler.)

Plate XCIV. Fig. 348.

Diverticulitis of the small intestine. Three diverticula are seen, two of them very large. The patient was operated on successfully for symptoms caused by their presence. A condition of ileal stasis can also be noticed, associated with Lane's kink. The cæcum and ascending colon are only partially filled, as the greater part of the bismuth is retained in the ileum and in the diverticula. (Dr Hope Fowler.)

Plate XCIV. Fig. 349.

Diverticulitis of the colon, showing the residue after a bismuth enema. Note the lumen of the colon and the diverticula to one or other side of the colon. (Dr Hope Fowler.)

Plate XCIV. Fig. 350.

Diverticulitis of the pelvic colon. Residue after seventy-two hours: the plate is reversed. (Dr Hope Fowler.)

PLATE XCIV.



FIG. 347.



FIG. 348.



FIG. 349.

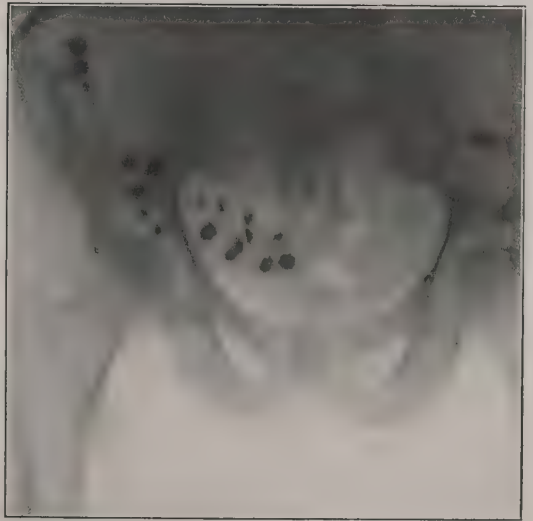


FIG. 350.

PLATE XCV.



FIG. 351.

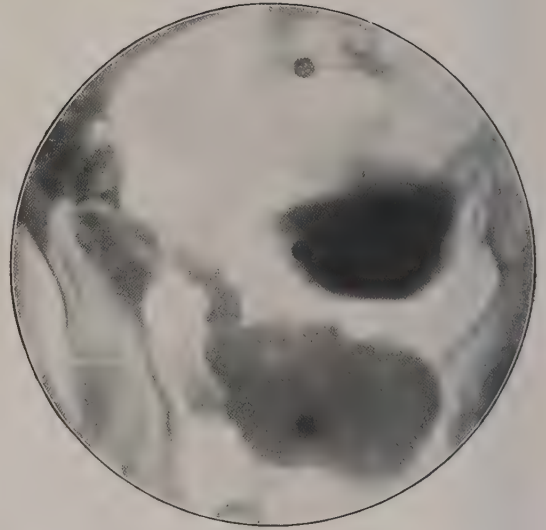


FIG. 352.



FIG. 353.

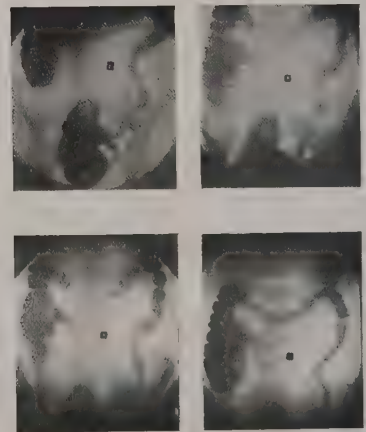


FIG. 354.

Plate XCV. Fig. 351.

Several diverticula can be seen throughout the small intestine. (Dr Hope Fowler.)

Plate XCV. Fig. 352.

Double barium meal showing a low atonic stomach and a spastic terminal coil of ileum entering cæcum at a fairly acute angle—Lane's ileal kink. (Dr Hope Fowler.)

Plate XCV. Fig. 353.

Another example of Lane's ileal kink. There is a good advance of the meal into the large bowel. Radiogram taken six hours after the administration of a barium meal. (Dr Hope Fowler.)

Plate XCV. Fig. 354.

An example of bismuth enema technique: (i.) shows the lower end of the pelvic colon, descending colon, part of the transverse colon, and the cæcum; (ii.) shows the upper limits of the flexures; (iii.) and (iv.) show the imperfect emptying of the colon, and on asking the patient to defæcate naturally, the cæcum becomes distended and there is a tendency to leakage at the ileo-cæcal valve. Note the spastic areas in the distal colon, which vary from plate to plate. These may be mistaken for filling defect due to a carcinoma. (Dr Hope Fowler.)

Plate XCVI. Fig. 355.

Multiple calculi in the right kidney.

Plate XCVI. Fig. 356.

Multiple calculi in the right kidney.

Plate XCVI. Fig. 357.

Calculus in the right kidney.

Plate XCVI. Fig. 358.

Large calculus in the left kidney.

PLATE XCVI.

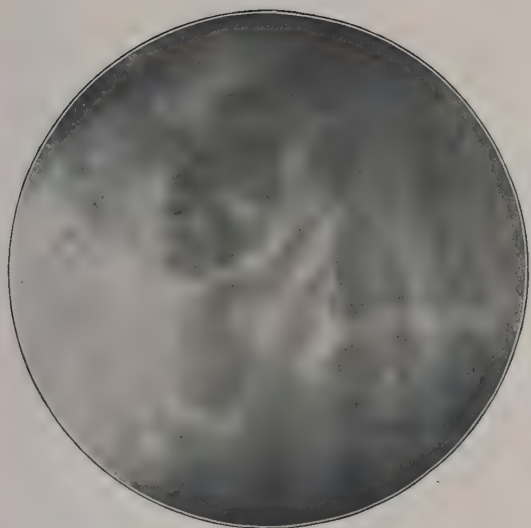


FIG. 355.

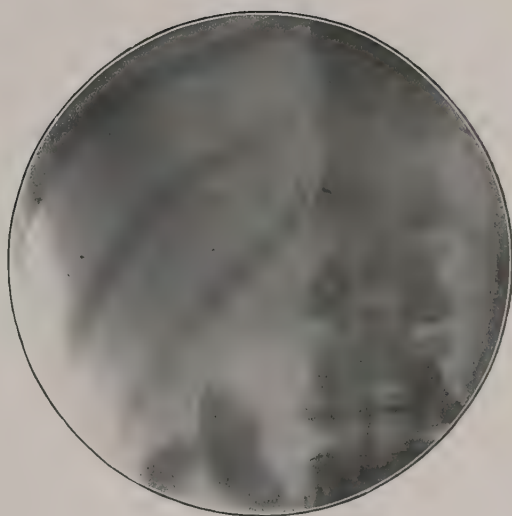


FIG. 356.

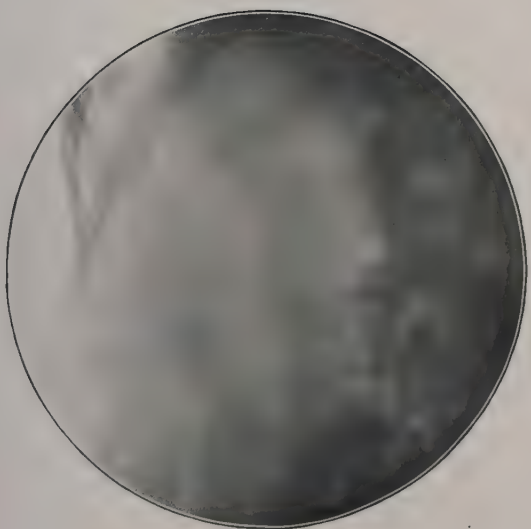


FIG. 357.

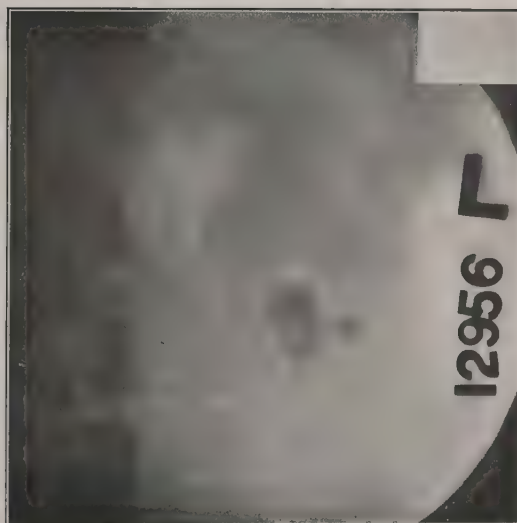


FIG. 358.

PLATE XCVII.

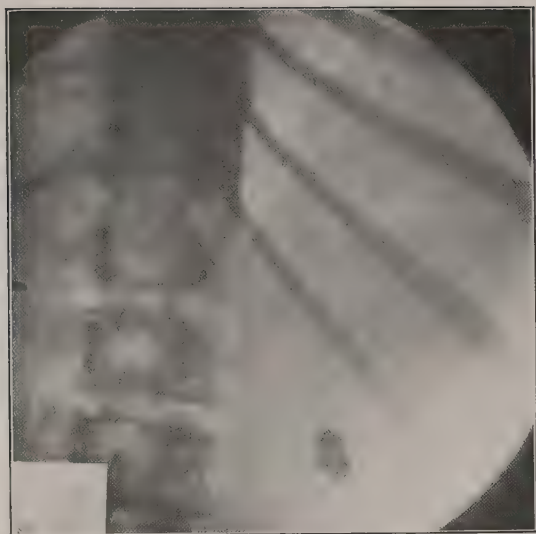


FIG. 359.

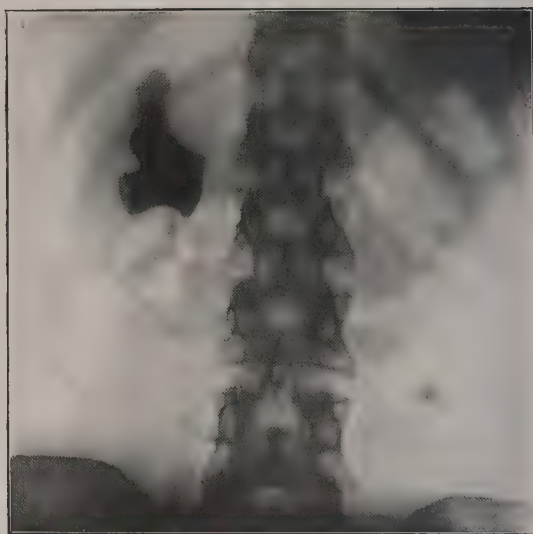


FIG. 360.

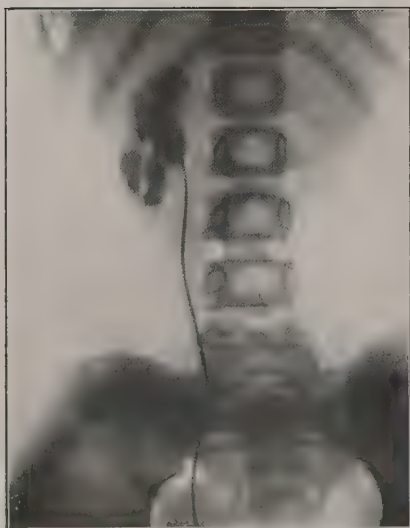


FIG. 361.



FIG. 362.

Plate XCVII. Fig. 359.

Small calculus in the left kidney.

Plate XCVII. Fig. 360.

Large calculus in the right kidney and small calculus in the left ureter. (Mr Henry Wade.)

Plate XCVII. Fig. 361.

Multiple calculi in the right kidney with ureteric catheter *in situ*. (Mr Henry Wade.)

Plate XCVII. Fig. 362.

Ordinary pyelogram; 20 per cent. sodium bromide introduced through a ureteric catheter (Mr Henry Wade.)

Plate XCVIII. Fig. 363.

The same case as Fig. 360, with ureteric catheters *in situ*, and 20 per cent. sodium bromide injected into the right renal pelvis. Note the calculus in the line of the left ureter. (Mr Henry Wade.)

Plate XCVIII. Fig. 364.

The same case as the preceding figure, with the left pelvis also injected. Note the exact site of the calculus at the upper end of the left ureter (Mr Henry Wade.)

Plate XCVIII. Fig. 365.

Ureteric calculus at the lower end of the left ureter. Observe its oval shape.

Plate XCVIII. Fig. 366.

Calcified lumbar glands giving rise to symptoms of urinary calculus. Note their irregular shape and structure.

PLATE XCVIII.



FIG. 363.

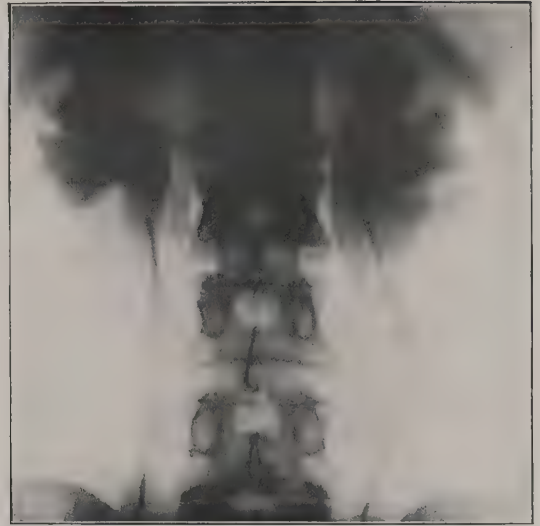


FIG. 364.

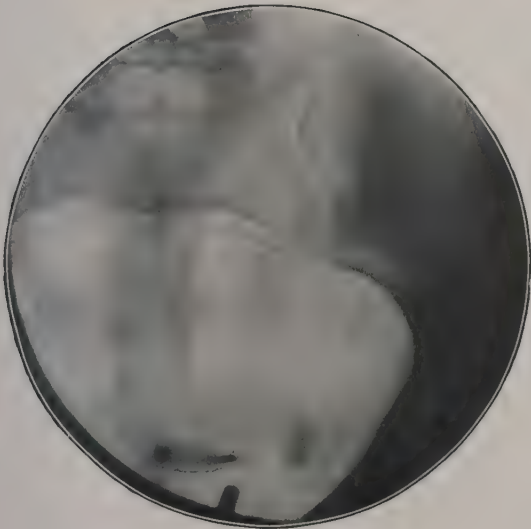


FIG. 365.

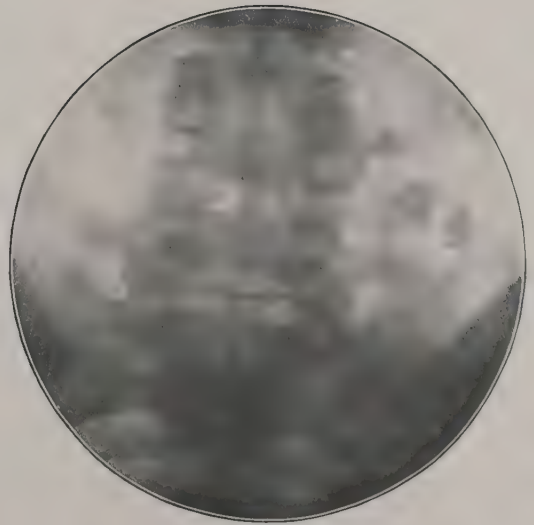


FIG. 366.

PLATE XCIX.

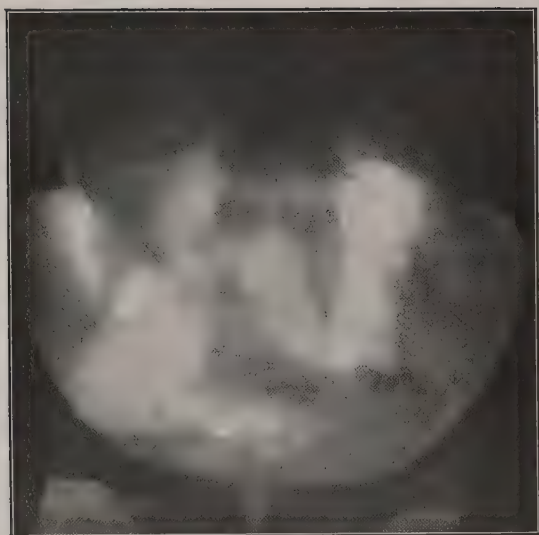


FIG. 367.



FIG. 368.



FIG. 369.

Plate XCIX. Fig. 367.

Phleboliths in the pelvic veins.

Plate XCIX. Fig. 368.

Pelvic position of the left kidney. Observe the cystoscope and ureteric catheters *in situ*
(Mr Henry Wade.)

Plate XCIX. Fig. 369.

Large vesical calculus.

APPENDIX

Plate C. Fig. 370.

Failure of union of the acromial epiphysis.

Plate C. Fig. 371.

Dislocation at the acromio-clavicular joint.

Plate C. Fig. 372.

Aneurysm of the brachial artery. Note the calcified plate in the wall. (Mr Walter Mercer.)

Plate C. Fig. 373.

Advanced tuberculous disease of the elbow joint. (Mr A. P. Bertwistle.)

PLATE C.



FIG. 370.

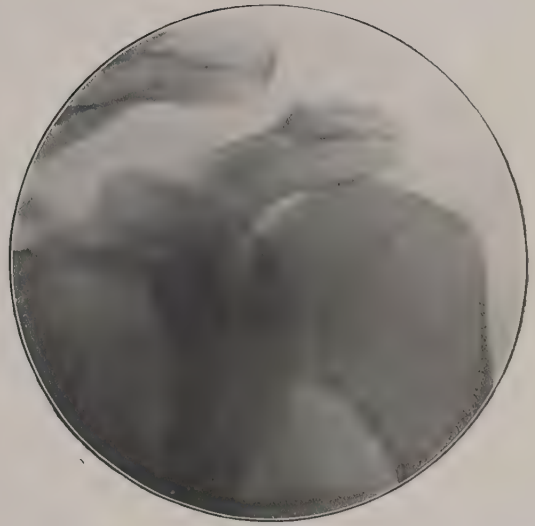


FIG. 371.

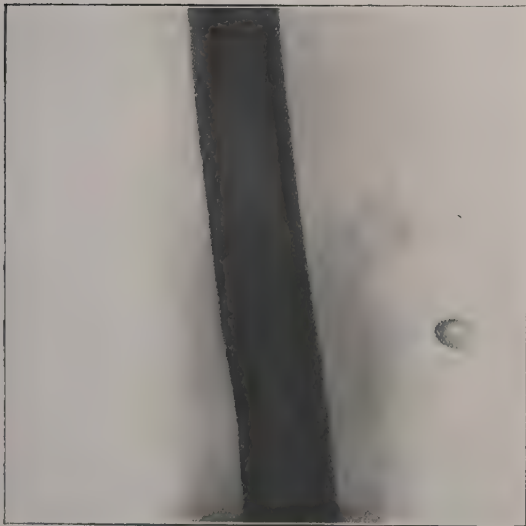


FIG. 372.



FIG. 373.

PLATE CI.



FIG. 374.



FIG. 375.



FIG. 376.



FIG. 377.

Plate CI. Fig. 374.

Chondroma projecting from the side of the radius. (Mr A. P. Bertwistle.)

Plate CI. Fig. 375.

Transverse fracture through the lower end of the radius. (Mr A. P. Bertwistle.)

Plate CI. Fig. 376.

Fracture of the radial and ulnar styloid processes. (Mr A. P. Bertwistle.)

Plate CI. Fig. 377.

Result of an excision of the wrist joint. (Mr A. P. Bertwistle.)

Plate CII. Fig. 378.

Stunting of the fourth metacarpal bone, the result of Panner's disease. (Mr W. Mercer.)

Plate CII. Fig. 379.

Dorsal dislocation of the right hip joint. (Dr Hope Fowler.)

Plate CII. Figs. 380 and 381.

Additional examples of pseudo-coxalgia. See Plate LIV. Fig. 210. (Miss Hertzfeld.)

PLATE CII.



FIG. 378.



FIG. 379.



FIG. 380.



FIG. 381.

PLATE CIII.



FIG. 382.



FIG. 383.

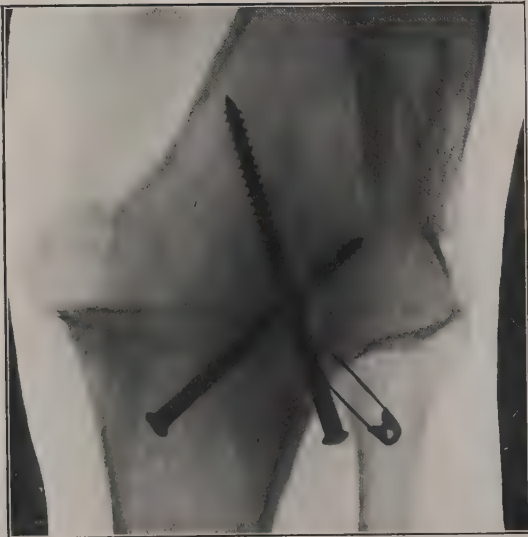


FIG. 384.



FIG. 385.

Plate CIII. Fig. 382.

Fracture of the tibia in a case of fragilitas ossium.

Plate CIII. Fig. 383.

Fracture in a case of fragilitas ossium. Note the fractures of both bones. The patient, a male fifty years of age, was never treated, not even in bed. X-ray three weeks after the accident.

Plate CIII. Fig. 384.

Excision of the knee joint. (Mr A. P. Bertwistle.)

Plate CIII. Fig. 385.

Loose osteo-cartilaginous body in the knee joint.

Plate CIV. Fig. 386.

Kohler's disease (tarsal scaphoiditis). See Plate LXI. Fig. 239. (Mr W. Mercer.)

Plate CIV. Fig. 387.

Ossific nodule in the tendon of the peroneus longus.

Plate CIV. Fig. 388.

Carcinoma of the mandible. (Edinburgh Dental Hospital.)

PLATE CIV.



FIG. 386.



FIG. 387.



FIG. 388.

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